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FIVE UNUSUAL CASES OF PROPTOSIS

BY

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THE causes of the pushing forward of the eyes, and perhaps more especially the pushing forward of one eye, often present an interesting problem which is made the more difficult from the inaccessibility of the orbital cavity. One cannot palpate a lump in the orbit in the way that one can in many other places, and although surgical exploration of the cavity may be proper, it is not possible easily to obtain a satisfactory access without dividing expansions or muscles or nerves, which later causes permanent deformity or disability; and further, the removal of part of the external orbital wall is an operation of some magnitude. X-rays are of great value, and their findings may prove conclusive in the way of evidence of disease of the sinuses, involvement of the bone, the presence of oxycephaly, or enlargement of the optic canal. They may, however, reveal no abnormality where, as is often the case, soft tissues alone are involved. The pulsation of a prominent eye greatly limits the possible causes. The past history, perhaps even a remote one of the removal of the breast or a growth elsewhere, may give the necessary hint that we have to deal with a metastatic deposit in the orbit, or the serious illness of the patient with signs of thrombosis of the cavernous sinus may

make the cause clear or, again, the site and severity of an injury may make it certain that haemorrhage into the orbit has occurred. There is besides a group which is insufficiently recognised because of its rather indeterminate nature. A patient comes for advice because of a prominent eye of a few days' duration, which may be attributed to a gnat bite or some such ordinary cause. The proptosis as a rule is not severe, and in many cases subsides completely in the course of a week, and leaves no residue, the whole reason for the proptosis remaining undiscovered. In some cases the proptosis is sufficiently marked to induce the surgeon to make an incision into the orbital cavity with the expectation of finding pus, but usually with a negative result. I believe such cases are due to the toxins from one of the neighbouring air sinuses infiltrating the orbital tissues, the ethmoids being the most likely, the sinus condition itself perhaps giving no symptoms, or symptoms of so slight a nature that they have been ignored. It is evident that such cases may, however, take on a more serious course, and an orbital abscess result. Case 4 is an example of this.

It will be agreed that cases occur in which none of the above ordinary causes of proptosis is operative, and in this connection four out of the five cases that follow are of interest. It will be seen that in four of them the certain cause remains doubtful for the recovery or at least survival of the patient has necessarily rendered complete elucidation impossible. They have a sufficiently varied probable cause for the proptosis to be of interest, and serve as problems for diagnosis for, as has been remarked, the diagnoses that I have suggested are necessarily lacking in finality.

The suggested causes are:—

1. The lodgment in the internal carotid artery of an embolus from the auricular appendix, or a plaque from an atheromatous patch in the aorta.

2. A misleading red herring drawn across the track of a long-standing arterio-venous aneurysm.

3. The spontaneous leakage from an atheromatous internal carotid artery.

4. A non-infective thrombosis of the cavernous sinus.

5. Necrosis of the internal frontal crest.

Case 1.—A woman, aged 62 years, whilst watching cricket, developed what she described as "a sort of kaleidoscopic effect before the left eye." This recurred later, and then a defect of vision was noticed. Two and a half years previously she had had her left leg amputated for gangrene as a result, it was stated, of a sudden block in the femoral artery.

She had been carefully examined, and no nephritis, diabetes, or vascular disease was discoverable; her Wassermann reaction was negative, and she appeared to be in really good health. The right eye was normal and healthy, the acuity was 6/6, and the field complete.

The sight of the affected eye was 6/12 partly, she had a defect in the visual field, and a partial optic atrophy. The left eye was a little more prominent than the right; its movements were unimpaired. The only other abnormality was a marked pulsation, of the spring manometer type, in the retinal artery of each eye.

In the absence of any discoverable disease, it seems that the sudden blockage of the femoral artery, the sudden loss of sight of the left eye, and the arterial pulsation in the retinal arteries, which was undoubtedly pathological in degree, must be connected, and any explanation must correlate these. I suggested as the likeliest diagnosis that she had aortic incompetence, although no clinical evidence of such was obtained (she refused to be X-rayed), and that with it she had thrombosis in the auricular appendix, from which emboli of some size had become dislodged, and had been caught up in the femoral artery on one occasion, and in the termination perhaps of the internal carotid at the later date.

As an alternative it seemed that she might have atheroma of the aorta, from which a plaque had become dislodged and produced the blockage on each occasion.

The physicians could find no evidence of this, and the patient, as I have said, refused to have her head and aorta X-rayed.

Case 2.—C.P., a man aged 38 years was brought to hospital having fallen and struck his head against some stone steps and become unconscious.

He was admitted with bleeding from a wound above the right eye, a large haematoma and a pulsating exophthalmos; it was suggested that he had an arterio-venous aneurysm which had ruptured.

His history was that sixteen years ago, whilst in the army, he was kicked on the side of the jaw by a horse; immediately afterwards he heard a rushing noise in the head, which had persisted, unchanged in character, ever since, and is still unaltered since the last accident. It has never kept him awake.

The right common carotid artery was tied at this time by the late Mr. Wherry. On admission he was semi-conscious. He had a swelling of the side of the face, and a haematoma in the orbit. The cerebro-spinal fluid was clear. He had right frontal headaches at times.

There was marked pulsating exophthalmos of the right eye, and pulsation in the vessels over the right upper lid; he had

fibrillary twitchings of the right sterno-mastoid. No abnormality was found in his reflexes. The systolic blood pressure was 140, the heart normal, and X-ray findings were negative.

When I saw him on December 30 last the noise in his head was the same as it had ever been since the first accident; it was not completely stopped by pressure on either carotid, but he thought pressure on the left was more efficacious in this respect than on the right (the right, it will be remembered, had been ligatured).

The acuity of the right eye was 6/18, the visual field was a little restricted, and the retinal veins on this side were definitely distended as compared with the left.

I suggest that he had an arterio-venous communication in the right cavernous sinus, which was substantially cured by ligature of the common carotid artery, and that the present accident was a rather alarming and misleading red herring drawn across the normal even progress of his nearly cured aneurysm.

Case 3.—M.C., a woman aged 48 years, suddenly developed, seven weeks ago, violent pain all over the head " like a band of steel round it." It lasted three days. At the same time the left eye became painful and bloodshot. She fell, but did not lose consciousness.

Six weeks ago the pain subsided, but she developed thumping in the ear; the vision was unaffected. Three weeks ago the eye bulged. One week ago the swelling increased so as to close the eye completely.

She suffered from bronchial asthma. Menopause three months ago.

On admission she complained of a dull aching pain above the left eye and throbbing in the left temple; she could hear the heart pumping in her left ear, and this noise keeps her awake at night. She had had no serious illness. Of three children two were alive, and well; one died of pneumonia. Her husband was well.

She was of a plethoric appearance. Her chest showed signs of emphysema, and râles were present all over it. Her urine was free of sugar and albumen. Her heart was hypertrophied, the systolic blood pressure was 210, the diastolic 100. Her Wassermann reaction was negative. *Eyes*:—Right, RV 6/9; all natural.

Left: the eye is pushed forward, the movements are limited, there is an expansile pulsation; no ptosis is present. There is marked chemosis. The retinal veins are engorged. Visual acuity 3/60.

A bruit is present which is heard loudest over the right orbit and is completely arrested by pressure on the left common carotid. X-ray examination by Dr. Dudley Stone revealed no abnormality. She was also seen by Professor Fraser, Mr. Paterson Ross and Dr. Beattie.

Progress.—The noise in the head became a sort of whistle, but was sufficiently disturbing to keep her awake at night. She was seen three months later, when all the signs had abated, but all were still present. She expressed herself as being greatly improved.

This patient was the subject of arteriosclerosis, and it seems likely that spontaneous leakage occurred from an artery into the cavernous sinus, owing to a diseased condition of its coats.

Case 4.—E.D., a man aged 24 years, attended hospital on account of diplopia. Eight weeks previously he awoke with a headache, which passed off. Three days later he found he saw double on looking to the right.

When first seen eighteen days ago, there was a slightly tender lump to the outer side of the right orbit, slight proptosis, and no outward movement of this eye.

One week before attending hospital he developed a severe headache, and vomited a number of times. The vomiting had no relation to taking food, and his appetite was not affected. One day later the left eye became swollen.

Past History.—He had always been healthy. He had been somewhat troubled by headaches for the last few years, especially after games. Two years ago he had a bicycle accident, and injured his teeth, face, and forehead.

Symptoms on Admission.—He complained of headaches over the forehead, nausea, vomiting two or three times daily.

His urine showed no abnormal constituents. His systolic blood pressure was 105 mm., the diastolic being 68 mm. His temperature was 98° and his pulse 80, and examination revealed nothing abnormal. The red blood count was 6,520,000, the white 9,000, and haemoglobin 110 per cent. The coagulation time was 1½ minutes, the blood viscosity was 4·7 (the normal being 3·6 to 5·4). His spleen was palpable.

The proptosis of the right eye had a good deal subsided, the left now being the more prominent. The chemosed conjunctiva of the left eye protruded from between the lids, all the movements of both eyes were restricted, and diplopia was troublesome.

Ophthalmoscopic Examination.—The discs were normal. The right retinal veins were perhaps a little engorged, whilst those of the left side were definitely so, but no other abnormality was found. Rhinological examination revealed no disease.

His chief symptom, apart from seeing double, was a severe headache. He looked ill, was lethargic, and had lost much weight. On discharge from hospital he had almost regained his normal weight, was feeling well, the headache and vomiting had stopped completely, the chemosis had disappeared, and almost the only residue of his illness was some diplopia.

I can think of no explanation of this man's illness except non-infective thrombosis of the cavernous sinus.

Case 5.—J.L., female aged 21 years, was admitted to St. Bartholomew's Hospital on July 5, 1935, with a tender diffuse swelling of the whole of the left orbital region, with proptosis. Her tale was that fourteen days previously she had had a stye on the left upper eyelid. Five days ago a bee had stung her on the same lid. For three days she had neuralgic pain over the left side of the face, radiating down from the middle of the left eye to the teeth. Two days ago a swelling developed at the inner side of the eye, which was attributed to sunburn. Yesterday the swelling had extended over both lids and on to the cheek. There was slight epistaxis. She was disposed to attribute her condition to the sting of the bee. The temperature was 102°, pulse 96, respiration 20, and leucocyte count 20,000.

Past History.—It was elicited, but only at a later date, that for more than a year she had had recurrent severe colds, which had affected the left side of her nose more than the right. On the day following her admission I asked Mr. F. C. W. Capps to see her. He found the left side of the nose filled with creamy pus. X-rays at this time showed opacity of the left frontal sinus, of the ethmoid and left antrum. Her temperature rose to 103·8°, her pulse to 120 and her respiration to 23. Cultures of the left conjunctival sac showed the presence of staphylococcus aureus in scanty quantities. On July 8, her condition clearly was worse. There was slight rigidity of the neck. I made an incision into the left orbit under gas and oxygen anaesthesia, but did not find pus. A rubber glove drain was sewn in. Mr. Capps was reluctant to do a bone operation in the acute stage, and I believe this attitude was wise and was justified. On July 9 she vomited twice, and had incontinence of urine and faeces. Her temperature rose to 104·6°, her pulse was 110. Next day she was delirious and had two fits with flexion of the left elbow, turning of the head to the left and conjugate deviation of the eyes to the left. She was unconscious for about two minutes in each fit and was incontinent. On July 12 a rather dramatic change for the better occurred. Her temperature fell to 101°, her pulse to 100. She became quite conscious, asked for food, was no longer incontinent, and coincidentally with the improvement pus began to escape from the orbital wound. On July 26 her left antrum was washed out by Mr. Hogg, and later by Mr. Capps. A discharging fistula was present in the left upper lid. On August 9 she was discharged from hospital, and from then onwards her progress to recovery was gradual and not seriously interrupted, though not uneventful.

On January 1, 1936, Mr. Capps opened the left frontal sinus

and found much granulation tissue and multiple sequestra. On May 20, the sinus having failed to heal, he again admitted her to hospital, removed the outer table of the skull and exposed a cavity which was extra-dural in position, and contained a sequestrum about ½in. to ¼in., which was readily recognisable as being the lower end of the internal frontal crest, with the groove in it leading down to the foramen caecum. The wound slowly healed completely and permanently, and recovery is complete.

A series of X-ray photographs were taken by Drs. G. Simon, J. B. Douglas and J. V. Sparks. The progress of the change in the frontal bone and the opacities of the sinus were clearly demonstrated. On April 20 Dr. Simon reported, " There is a cavity in the frontal bone just above the upper part of the sinus, with a sequestrum in it."

Comments

Case 1.—In this case I feel the suggested diagnosis is especially speculative. Proptosis was slight and so, I suppose, was due to local oedema of vascular origin. The pulsation of the retinal arteries was very marked, and was, I am sure, pathological, and indicative of aortic insufficiency, and I say this in spite of the fact that no other clinical evidence of this lesion was noted. I take it there can be little doubt but that blockage of the femoral artery occurred, and if so it seems probable, apart from any other consideration, that the eye lesion of sudden onset had a similar cause.

Case 2.—In this case a man was brought into hospital with a wound over the right eye, a large haematoma of the face and forehead, and pulsating exophthalmos, and until he was sufficiently conscious to give an account of himself and explain the scar in his neck, it seemed that he had just sustained an injury which had given rise to an arterio-venous communication in the cavernous sinus.

Case 3.—In this case the diagnosis of a spontaneous leakage from a diseased internal carotid artery must, I think, be correct. There was no question of injury, syphilis could be excluded, and she was known to be the subject of advanced vascular disease. If this be the true explanation, it is certainly a rare cause of the condition.

Case 4.—Of the man whom I suggest has had non-infective thrombosis of the cavernous sinus I can see no alternative explanation. I have previously seen a case in a woman who had recently recovered from pneumonia, but I was unable to find any notes of her. I remember that in essentials she was similar to the present case, and that she recovered, but of necessity, as in all the present cases, the diagnosis lacks substantiation.

Case 5.—It will be seen that this is a case on the borderline between the territory of the rhinologist and the ophthalmic surgeon, and is representative of what is an important and not rare group; a class of case where, when the disease progresses to a serious and dangerous degree, the cause is likely to become revealed, but a number of cases occur which belong to this group where the only sign is slight proptosis which persists perhaps for a few days only and subsides, leaving no disability, and the basic cause unrevealed. I believe such cases are due to an infiltration of the orbital tissues by toxins spreading into them from adjacent air sinuses, the nasal symptoms being so slight as to have evoked no particular discomfort.

WILLIAM PORTERFIELD, M.D.

BY

R. R. JAMES

LONDON

PORTERFIELD'S claim to remembrance rests upon his " Treatise on the eye," which was published, in two volumes, in 1759. I have found considerable difficulty in obtaining any facts about him. One would have thought that it should have been possible to get details of the life of one who was President of the Royal College of Physicians of Edinburgh in 1748, but such is not the case. Porterfield's name does not occur in the *Dictionary of National Biography*, nor have I found it in any of the ordinary books of medical biography at my command. My knowledge of his life is almost entirely derived from Innes Smith's *Register of English-speaking Students at Leyden* and from Dr. John D. Comrie's *History of Scottish Medicine*. Porterfield's parentage has so far baffled research. No doubt he sprang in the first instance from the well-known family " of that ilk " which was long settled in Renfrewshire. Innes Smith gives Ayrshire as the place of his birth.* Facts about the Porterfield family are obtained from Crawfurd's *History of the Shire of Renfrew* (1818), in which the descent from Stephen de Porter, who had a charter for Porterfield from Robert, Earl of Strathern, c. 1362, is traced. I feel sure that William Porterfield satisfied Sir Walter Scott's dictum.

There are a number of Porterfield wills in the Glasgow Commissary Court but, so far, the will of William Porterfield has not been discovered. Dr. Comrie informs me that he is sometimes confused with Walter Porterfield, who joined the College of Surgeons of Edinburgh in 1684. I have wondered whether William

* The Porterfields of Hapland descend from Gabriel, son of Master John of that ilk, and Jean Knox. Paterson's History of Ayr and Wigton (1866).

may not have been a son of this Walter. Of the wills in the Edinburgh Commissary Court I note that of Mr. Walter Porterfield, of Colmistone, June 24, 1665.

Innes Smith gives:—" Porterfield, William. *Scotus*. 24, Jan. 1718, aet. 22. M.D., Rheims, 24, Aug. 1717. F.R.C.P., Edin., 1721. President of the College, 1748. Invented the optometer. Died, at Sancerre, France, 21, July 1771."

It will be seen that he must have been born about 1696; and that he was of good professional standing at home when he entered Leyden. Doubtless it was the reputation of Boerhaave and his teaching that induced Porterfield to take this post-graduate course. Dr. Comrie informs me that he was appointed Professor of Institutes of medicine and of Medicine in the Town's College at Edinburgh in 1724, and he appears to have held the post for two years, but it does not seem to be certain that he gave any lectures at this time. He is described in his commission as being " disengaged from the necessary business of all other public professions." This has led Dr. Comrie to think that he may, to a large extent, have given up practice; but the fact that at some time before he published his book, he had undergone amputation of one of his legs may possibly have had something to do with it.

I find that he had the licence of the University of Edinburgh to practise on June 8, 1721; and the Edinburgh Marriage Register, printed by the Scottish Record Society, 1908, tells us that William Porterfield, M.D., married Mrs. Elizabeth Brown, widow of David Henderson, of Tunnochside, March 20, 1743.

Reverting for a moment to the question of his amputation, he refers, in dealing with the perception by the sensorium of the picture formed upon the retina, to the cases where " a person, after the loss of his limb, has the same perception of pain, itching, etc., as before, and feels them as if they were in some part of his limb, tho' it has long ago been amputated, and removed from that place where the mind places the sensation. Having had this misfortune myself, I can the better vouch the truth of this fact from my own experience; for I sometimes still feel pains and itchings as if in my toes, heel, or ancle, etc., tho' it be several years since my leg was taken off."

The full title of his book is: A Treatise on the Eye, the Manner and Phaenomena of Vision. Edinburgh. Printed for A. Miller at London, and for G. Hamilton and J. Balfour, at Edinburgh. MDCCLIX."

The first volume contains upon the title-page an extract from Newton's " Opticks," query 28; the second volume has an extract from the Latin *Cosmotheoros Hugenii*, p. 40.

The book is not a text-book on diseases of the eye; it is an account of the anatomy and physiology of the organ and contains

a good deal of speculative philosophy. Porterfield tends to be rather diffuse in places and is apt to repeat himself, but it cannot be doubted that the book was a remarkable production for the age in which it was written. I believe it to be rather scarce. In the old catalogues of the Library of the Ophthalmological Society it was one of those marked with an asterisk, which meant that it could not be taken out of the library. My own copy was given to me many years ago by my senior colleague, Mr. Harold Grimsdale.

By the middle of the eighteenth century the knowledge of the naked-eye anatomy of the eye had made great strides; but though the position of the lens in the eye was well known, Porterfield still held the view that the coats of the globe were derived from the sheaths of the optic nerve, the sclerotic being derived from the dura, the choroid from the arachnoid, and the retina from the fibres of the optic nerve. He thought that the conjunctiva took its origin from the periosteum of the orbit; the internal membrane of the lids, which he recognised as joining with the skin at the lid edge, he says folds back again over the outward face of the eye above the conjunctiva, to which it adheres and with which it terminates at the limbus. And in a later page he states that the outermost layer of tissue is continued over the cornea. "This cuticle seems to be a production of the epidermis, or scarf-skin which at the edge of the eye-lids folds inwards, so as to cover the inside of the eye-lids, and at the edge of the orbit folds back again over the whole outward face of the eye." He adduces the varying positions of phlyctenulae on the limbus and in the cornea itself as a proof and refers to snakes which cast the cuticle along with their skins.

His account of the external muscles is good; he recognised the sphincter of the iris as well as dilatator fibres and he refers to the muscular fibres of the ligamentum ciliare or ciliary body. He emphasised the fact, noted by Sorsby in the *Short History of Ophthalmology,* that the power of accommodation is lost after cataracts have been couched or removed.

He corrected the erroneous statement of Willis and Briggs that the optic nerve is inserted at the back of the eye in the optic axis; and he assumed that the retina is the percipient layer of the fundus, though he discussed at length Mariotte's view that the choroid was the percipient layer. With this view he cannot agree. Porterfield's theory of accommodation was that the crystalline is moved forwards by the contraction of the ciliary processes.

Coming to the physiology of vision, Porterfield deals fully with the properties of light. He notes the fact that the ancients knew all about catoptrics, but very little about dioptrics until the time of Kepler's discoveries. His account of the properties of light is obviously based on Sir Isaac Newton's work, and at his date

he could not have gone to a better authority. The following extract is a good example of his writing. "That great philosopher (Newton) having, in his *Principia,* shewn how far numbers and geometry would go in Natural Philosophy, has, in his Optics, manifested to the world to what surprising height even vulgar experiments, duly managed and carefully examined, in such hands, may advance it; for, to the honour of this great man, it is to be observed, that he was led to all his discoveries in optics, as he himself tells us, by observing the oblong form of the sun's image cast upon the wall of a dark room, by means of a prism placed at a hole in the window-shut. This was an experiment at that time well known to all naturalists; but it was reserved to Newton to discover, and, by his superior skill in geometry, to demonstrate, against all his adversaries, that this image, on the old principle of an equal refraction of all the rays, ought to be circular, and consequently, that this oblong form proceeded from a different refrangibility of the rays whereof the sun's beam consisted, by means of which refrangibility the rays of different colours were separated from each other, and exhibited apart in the oblong coloured spectrum. And, having made this fundamental discovery, he also confirmed it by experiments, and was thereby led to contrive many other experiments by which he has opened the whole mystery of light and colours; as may be seen in the aforesaid treatise of optics."

Again, speaking of colours, he states that red acts with the greatest force and excites the strongest vibrations in the nervous coat of the eye; violet, the weakest and consequently produces only a weak, faint, dark colour; "but the green particles, being of a size equally distant from both these extremes, must, by exciting vibrations of a middling strength, produce a colour sufficiently strong and bright, while at the same time it does not offend the eye by its too great strength and vivacity; and this is the reason why green colours have in all times been esteemed useful to comfort, strengthen and preserve the sight."

Helmholtz states that Porterfield proposed using Scheiner's experiment for measuring the range of accommodation distances, and designed an optometer on this principle, which was afterwards improved by Thomas Young. In speaking of the pupil and its motions, Porterfield states that with a very large pupil "the tender substance of the retina would have been fatigued, dried, burnt, or otherwise hurt upon a thousand occasions . . for the humours of our eyes perform much the same effect with that of a convex lens or burning glass."

Jean Mery's observations on the living cat's eye under water are an early reference to the principles of the hydrophthalmoscope. He noted that in this experiment the entry of the optic nerve

and the vessels were distinctly seen; and Porterfield gives a nice little diagram to elucidate the optical principles. Just before this he allows himself to wander into the realms of fable; "there appears some ground for the fable in the *Alcoran*, which says that the cat is none of God's creatures, but that it was first produced in the Ark by the sneezing of the lion." Porterfield refutes the hypothesis of Briggs as to the reason of the single appearance of objects. This hypothesis is given in my account of Briggs in *Brit. Jl. of Ophthal.*, vol. xvi, p. 366.

There was, of course, much that Porterfield could not explain and he refers most of these difficulties to the will of God. But, even so, his book is a very remarkable production for the age in which it was written. He shows himself to be thoroughly abreast of his subject, and while referring to the views of his forerunners and contemporaries, both at home and abroad, he does not hesitate to disagree with their conclusions when they do not tally with his own ideas. I like especially the half humorous and half apologetic manner in which he corrects their mistaken notions. And the impression left upon my mind by a perusal of his book, is that William Porterfield was not only a brilliant exponent of his subject but also a very kindly Scottish gentleman.

If Mackenzie was the first British ophthalmologist to write a really good clinical text-book on ophthalmology, Scotland may well be proud of the fact that in an earlier age, Porterfield should have given to the world such a masterpiece.

I should like to express my thanks to Dr. Comrie, to whom I was introduced by Dr. Traquair; and I am grateful to my friend Mr. Harvey Bloom for his notes on the Porterfield wills and other references.

No portrait of William Porterfield is known to be in existence, and neither Mr. G. H. Viner nor myself have ever heard of his having used a book-plate. There are no letters of his in the Letter-Books of the Royal Society.

The Sloane MS. at the British Museum contains the following letter:—

Sloane MS. 4048, fo. 72/3.

Sir,

The College of Physicians at Edinburgh receaved the verie valueable complement of the 2d Vol. of your Natural History of Jaimaica, etc. They had also a present formerlie from you of the first Vol. immediatly after it was published. I am ordred by the Societie as their Secretarie and in their name to tender you heartie thanks for this and all your other favours bestowed on them. They are verie proud to have a person of so great

learninge and merite to be a member of their Societie who on all occasions so kindlie remembers them. They heartilee wish you all good health that you may further advance the knowledge of Natural Historie and long continue ane ornament to your Profession. I am with all respect Sr,

Your Most Humble,

Edinburgh — Most obedient Servant,

Octrb. 9, 1725. — WM. PORTERFIELD.

The Much Honoured
Sir Hance Sloan Barn^{tt}
President of the College of Physicians
in London

THE SURGICAL TREATMENT OF CHRONIC GLAUCOMATOUS OCULAR HYPERTENSION*

BY

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I.—Definition of glaucomatous ocular hypertension

PERSONS who present ocular hypertension following iritis, traumatism or tumour may have hard eyes and increased intra-ocular tension without necessarily being glaucomatous. While certain cases of this kind may be benefited by decompressive treatment, it is necessary to distinguish such conditions from true glaucoma and to define the signs of this affection, which illuminate its pathogeny and thus serve to direct its treatment.

(*a*) In glaucoma, *ocular hypertension* is an essential diagnostic sign, but one not exclusively peculiar to glaucoma. In the latter, the characteristic condition is not hypertension in itself, but the manner in which it occurs. Hypertension assumes a particular type in each of the several forms of glaucoma (prodromal glaucoma, chronic glaucoma with intermittent hypertension, chronic glaucoma with constant hypertension, irritative glaucoma, or acute glaucoma).

In prodromal glaucoma, ocular hypertension is of low degree. Subjectively, it is indicated by the appearance of a foggy or smoky veiling or by coloured arcs. Objectively, it presents pupillary

* For the thirty-third anniversary of subconjunctival and limbic sclerectomy.

dilatation and a slight milky turbidity in the cornea, due to distension of this membrane. These signs are transitory, but may recur sooner or later and more or less frequently, according to the instability present in each case.

Chronic glaucoma with intermittent hypertension is the form anatomically defined by von Graefe as optic atrophy with excavation. In this clinical type, hypertension is as difficult to perceive as in the preceding form, because it is also transitory. Other signs of glaucoma, such as alterations in the visual field (scotomata or the nasal indentation), in light sensation, in the papilla and in the amplitude of accommodation, are often those which permit diagnosis.

Chronic glaucoma with constant hypertension is the clinical type which occurs most frequently. While the tonus is constantly high in this form, it is characteristically variable in degree. In this type of glaucoma, with moderate hypertension, violent crises may follow emotional conditions or surgical procedures; the eye may harden, so to speak, beneath the surgeon's knife. This instability is shown inversely by the remarkable efficacy of rest and the use of miotics. For illustrating this feature, I reported to the Ophthalmological Society of Paris on March 19, 1932, a group of cases of chronic glaucoma treated medically and remaining exposed to danger, since operative treatment might at any time be urgently necessary for the relief of conditions created by simple emotion or mere physical pain.[1] The intermittent character thus occurs also in this type.

In irritative glaucoma, the ocular tension undergoes fluctuations which occur still more frequently. It is always evident, as shown by pupillary dilatation, changes in the corneal transparency, vascular congestion and a bluish and asphyxiated aspect in the episcleral circulation. This symptomatic group may prove deceptive for adherents of the inflammatory theory of glaucoma, who may mistakenly consider as signs of infection effects due only to passive lesions explicable solely by hypertension and the circulatory embarrassment which is secondary to it. The decisive test of the passive character of this pseudo-inflammatory condition consists in the possibility of operating surgically upon eyes of this type without inducing the complications which surely follow operating in the presence of acute iritis.

Acute glaucoma presents hypertension having from the onset the hardness of absolute glaucoma. It is related to Quincke's disease or to urticaria, and appears as if released by every stimulus possible when acting in predisposed tissues. In urticaria, all the occasional and determining causes constitute an urticarial summation of stimuli; there is similarly a glaucomatous summation producing the affection, in which we find humoral and colloido-

plasmatic instability having the same paroxysmal character and doubtless depending upon a similar pathogenic process.

To summarise, glaucomatous hypertension presents the distinctive character of *intermittence,* which reveals its critical and paroxysmal nature.

(*b*) *Alterations in the visual field* in cases of glaucoma consist in nasal and inferior *narrowing*. This sign is notorious and requires stressing only in order to recall the fact that its constant and early appearance renders it characteristic of true glaucoma.

However, this is not the only change in the visual field. *Scotomata,* mentioned for the first time by Landesberg, in 1869, are of great symptomatic importance. Their early occurrence shows the developing disease. The commonest form, the paracentral scotoma of Bjerrum, is typical. It has the appearance of a crescent several degrees wide, in contact with the Mariotte spot and is incurved about the macula. Through fine elongation it extends to the limit of the peripheral visual field.

Angioscotometry has rendered the study of these incipient scotomata more precise. The Mariotte spot may become enlarged, and mild subjective signs are explained by conditions occurring in the more advanced stages, in which the scotoma becomes absolute and reaches the periphery of the visual field, which narrows and thus seems to meet the advancing scotoma. In this way indentations or notches are formed, which tend to surround the macula without invading it. Scotomata of this kind are never positive, not being projected and remaining identical both for white and for colours.

(*c*) Many writers have devoted special attention to the *light and colour sense* as affected by glaucoma, but the significance and value of changes in them have been clearly shown by Beauvieux[2] and Delorme,[3] who noted that "altered differential minimum, with normal light sense and perfect preservation of the colour sense" are the characteristic features of incipient glaucoma and who showed the pathognomonic value of these disturbances, which differ from those observed in other forms of optic atrophy. Minor signs of glaucoma consist of

The Bjerrum paracentral scotoma,

Loss of the differential light sense,

Preservation of the absolute light sense.

(*d*) The specific characters of the glaucomatous syndrome consist in *somatic lesions* of the deeper membranes, vessels and optic nerve.

In the retina, the typical changes consist of arteriosclerosis

accompanied more or less distinctly by hypertrophy of the connective tissue. The vascular sclerosis present thus forms a predisposition to reflect rapidly the slightest changes in ocular tension.

In the uveal tract, the most evident lesions occur in the iris and ciliary body (sclerosis of the iris vessels and atrophy of the ciliary body), but it is necessary to stress the importance of changes in the irido-corneal angle corresponding to the reticular tissue of the canal of Schlemm. In glaucoma, gonioscopy reveals at this site an alteration which explains changes in the mechanism of ocular excretion, which consists of the Knies consolidation or union obliterating the angle of filtration, a change which is continually aggravated by the glaucomatous process, in which cytological débris is accumulated toward this angle. In this way the channel for normal escape of the interstitial liquid becomes occluded.

The optic nerve, showing papillary excavation on ophthalmoscopy, presents histologically lacunae related to the vascular changes. These lacunae have been described by Schnabel and studies made by Felix Lagrange[4] prove that they result from secondary vascular changes dependent upon intra-ocular hypertonus. The papillary excavation which is shown by the ophthalmoscope to resemble a gourd, really terminates in a deep conical prolongation which penetrates between the vessels and pushes them apart. In view of these facts, vascular sclerosis does not appear to be the initial determining factor of true glaucoma, but rather to be a abiotrophy condition predisposing to vascular obliteration and favouring neuro-retinal atrophy.

II.—Pathogeny of glaucomatous ocular hypertension

From the various theories concerning this point, the opinions of three writers require special attention. They are Donders, Knies and Schnabel.

1. The tension retaining the aqueous humour within the eyeball seems to be specially governed by the action of the *pars ciliaris retinae*. In 1883, Boucheron presented to the French Ophthalmological Society an initial contribution to this point, contemporary with the work by Ranvier maintaining that the epithelial elements were superficial glands. These findings are confirmed by pathological histology. The presence in the ciliary body of adenomas, epitheliomas and carcinomas, described by F. Lagrange[5] in his treatise on tumours of the eye, tends to affirm the existence of a differentiated tissue whose structure shows that it is actively concerned in elaborating the aqueous humour.

The mechanism of this secretion may be explained by referring to the classical ideas concerning the physiology of the sympathetic. Without entering here upon this physiological question, we may recall the fundamental experiments upon the chorda tympani and the functional activity of the submaxillary gland. The sympathetic is the nerve of secretion, it increases ocular tension when stimulated and the decisive experiment by Pourfour du Petit and Claude Bernard supports the entire physiology of the sympathetic in its relations with the eye. The individual designation of the secretory nerves is due to the work by Dastre and Morat in 1878 and studies showing their autonomy and functional individuality were made by Heidenhain. It evidently remains to define the nature of the profound causes which may precipitate hypersympathicotony, but the foregoing suffices at least to render homage to the theory of "secretory neurosis" suggested by Donders with reference to glaucoma.

2. The alteration in the evacuation of the ocular liquids from the corneo-scleral shell becomes added more or less rapidly to the condition of hypersecretion, often occurring during the first stages of the disease.

If Chinese ink be injected experimentally into the eye of a laboratory animal, it may be recovered from Fontana's spaces. Aided by the Gullstrand illumination, Koeppe has been able to view "dust-like particles" accumulated during glaucomatous crises, but Knies has the merit of being the first to point out the important and constant feature of the blocking of the excretory pathways.

3. Secondary trophic disturbances affecting the vessels of the retina and involving the optic nerve add new complications, in varying degrees. These complications result from a vitiated hydrostatic condition and are beyond the control of the mechanism regulating the intra-ocular circulation. All causes which favour vascular sclerosis, especially syphilis and senility, constitute aggravating factors in the progress of these trophic disturbances secondary to hypertension occurring in a closed chamber, which finally produce optic atrophy and the papillary excavation of Schnabel.

In brief, though from the viewpoint of general pathology there still remain in the pathogeny of glaucoma certain obscure points referring to the true causes of the sympatheticotonic disturbances, the metabolic changes and the liquid exchanges, one fact is shown by clinical observation, namely, that glaucoma is related to nervous, organic, psychic and doubtless humoral instability, and to a so-called diathesis. It has the characters of an "essential disease," whose effects vary according to defective functioning which is individual, congenital or acquired with advancing age,

the variations constituting factors which have great influence upon the course of the disease. Of its factors, standing in the order of their importance, hypertension occupies the first place and the therapeutic problem is *to prevent vitiation of the liquid exchanges by medical treatment or to avert, by surgical measures, the retention of liquids which is fatal for the neuro-retinal structures.*

III.—Treatment and its results

(*a*) *Indications.*—It is but logical to attempt to render the diseased organism normal by medical treatment. Action becomes but hypothetical, however, if the circulatory disturbances considered essential factors of the glaucomatous condition are combated by medical treatment. Realities are departed from if medical treatment be opposed to operative measures.

Medical treatment is sometimes capable of retarding the course of the affection, of relieving certain prodromal signs of glaucoma and of rendering grave intermittent exacerbations less frequent. Such treatment includes good correction of ametropia, especially inverse astigmatism (Javal), attention to algetic states in the vicinity (facial and trigeminal nerves), study of the oculo-ocular reflexes, medication regulating sympathetic imbalance (eserine salicylate, gardenal or luminal, and opotherapy), treatment with calcium chloride or iodides, cardio-vascular tonics, correction of hyperglycaemia and antisyphilitic medication. It is necessary to utilise all these measures because they have an unquestionable influence upon the course of the disease, provided the action of miotics be never arrested. Pilocarpine is the sole medicinal agent whose efficacy and mechanism are truly comparable to those of surgical fistulization.

However, are not the successes obtained with medical treatment alone unusual, as indicated by the publication of almost every case in which medical treatment appears wholly sufficient? It was in view of this very probability that I devoted prolonged study[6] to a case of chronic glaucoma presenting grave intermittent crises and occurring in a girl in accord with the menstrual cycle. Here I noted the action of opotherapy, completed my observation by indicating the cure of ocular hypertension during pregnancy and eventually pointed out various signs of humoral imbalance which replaced in this case the glaucomatous attacks, these signs consisting of crises of anguish, urticaria and paroxysmal tachycardia, the Raynaud syndrome and other signs of similar nature. All of these facts lie within the field of the clinical forms of hypertension, whose characters I have sketched for showing what it is proper to express concerning the efficacy of medical treatment.

For guidance, it is necessary to make a choice among the symptoms which occur. Points guiding toward truly active therapy should be simple, clear and based upon the principal elements in the pathological syndrome. Persistence of a physiologically altered mechanism is shown by tonometry. Measurement of the central visual acuity and perimetry show the extent of existing lesions and their progressive tendency. How is it possible for surgery to be imprudent and inadvisable if the following conditions exist in spite of medical treatment?

1. Decline in central visual acuity.
2. Failure of the ocular tension to become normal (20 with the Schiötz tonometer).
3. Progressing alteration in the visual field, either in the paracentral zone of Bjerrum, or through nasal or inferior peripheral narrowing.

These three cardinal points must be thoroughly verified by examinations made methodically and periodically. Fluctuations in tension, narrowing of the visual field and declining visual acuity have the same significance. Any single one of these signs suffices in itself to prove that the disease is progressive and menacing, that it cannot be combated by medication designed to modify miopragia (as in syphilis, sclerosis, etc.), although such medication is important biologically but of secondary value from the practical viewpoint, and that it cannot be reached by the exclusive use of miotics.

Surgical treatment, though reaching only the hypertensive syndrome, is a measure of prudence and the only palliative one of permanent and durable efficacy, for the idea that hypertension in the eyeball presides over all the ocular signs of glaucoma remains still good.

Now, what surgical treatment is appropriate?

In *acute* glaucoma, the value of iridectomy is unquestionable. von Graefe has placed a curative procedure in our hands which renders his name immortal. In *chronic* glaucoma, the value of iridectomy has been tested and de Wecker, in a report presented to the French Ophthalmological Society in 1901, has shown the results of a memorable inquiry addressed to all the well-known contemporaries, who replied that iridectomy, like all other operations employed at that time (such as puncture or sclerotomy), is very disappointing in chronic glaucoma.

Solution of the problem of durable fistulization of the eye and establishment of the principle of action and the site of election were the innovations provided by *subconjunctival and limbic sclerectomy*, or fistulization of the eye as obtained by the subconjunctival resection at the scleral limbus of a fragment of the

ocular shell (Felix Lagrange, 1905).[7] Amongst the numerous operators who have more lately devised instruments and technique for individual performance of subconjunctival and limbic sclerectomy, Elliot is surely the one who has done most to popularise the operation of Felix Lagrange, especially through his personal dexterity with the trephine. The question of operative technique is the one which I propose to stress to-day.

(*b*) *Technique.*—Eleven years ago I indicated,[8] in the Annales d'Oculistique for September, 1926, the operative procedure which I prefer. I gave the details of instrumentation and a schematic plan of the operative stages of the original technique upon which the method of subconjunctival and limbic fistulization is based, and whose principle I most piously continue to observe, since I have daily occasion to admire its incomparable efficacy. Now, what is the best form of knife?

The blade should be narrow and thin, but not flexible, in order to work in the irido-corneal angle. Effacement of the anterior chamber often so narrows the passage for the knife that I am inclined to doubt whether the angle is actually incised at its apex when the anterior chamber is entered, as in glaucoma. The Nicati knife is good, but the sclerotome obtainable from good makers is better. It is shown here in the natural size. The blade is short and narrow, the tip fine and the back wide. The breadth of the back is absolutely necessary for the puncture of certain especially rigid sclerotics (Fig. 1).

FIG. 1.

The knife is held in the right hand, a fixation forceps in the left hand. The eye is immobilised, lightly but firmly, by grasping it near the limbus, near seven o'clock for the right eye (Fig. 3). It is grasped near five o'clock for the left eye (Fig. 4), because when so placed the left hand can more readily orient the eyeball and fix it on the tip of the knife at the moment of counter-puncture and upon the knife-edge when the flap is cut.

What is the site of puncture? In replying, it may be recalled that there is an average distance above of 1·75 millimetres between the apex of the irido-corneal angle and the limbic limit of the separable part of the conjunctiva. This zone is that where the cornea is held by the sclerotic, as a bevelled watch-glass might be held. The corneal bevel is nearly 1 millimetre high. The scleral

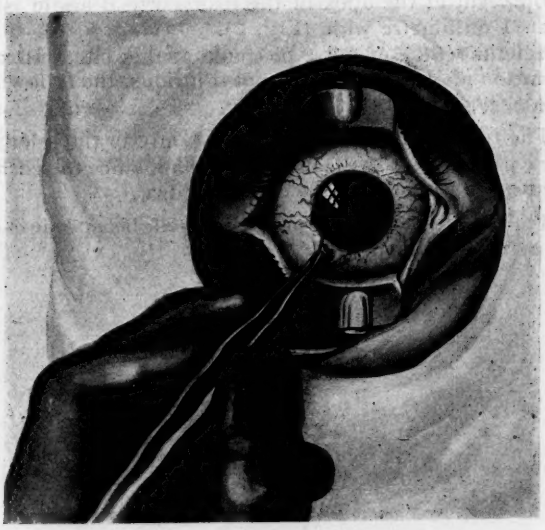

FIG. 3. Right eye.

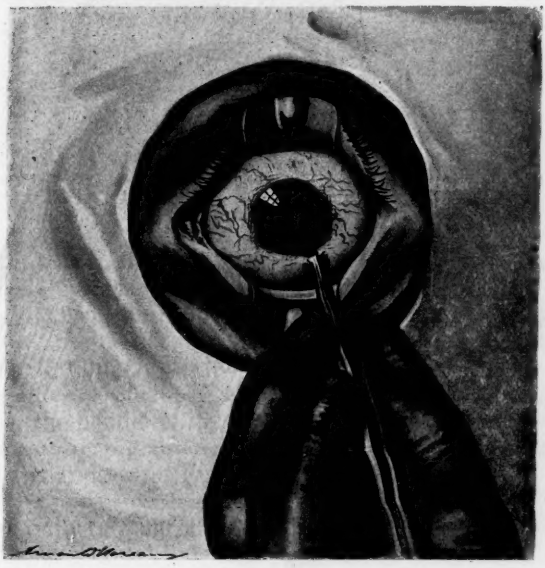

FIG. 4. Left eye.

portion present at the apex of the irido-corneal angle is therefore less than 1 millimetre wide (Fig. 2).

The scleral resection must be made at this site. In order that the operation may be useful and not injurious, the following points must be observed.—

1. The tissue excised should consist only of the sclerotic, without any corneal tissue at the base of the flap, since the corneal tissue proliferates and obstructs the scleral orifice.

2. The ciliary body must not be injured, because it is the hilum of the eye.

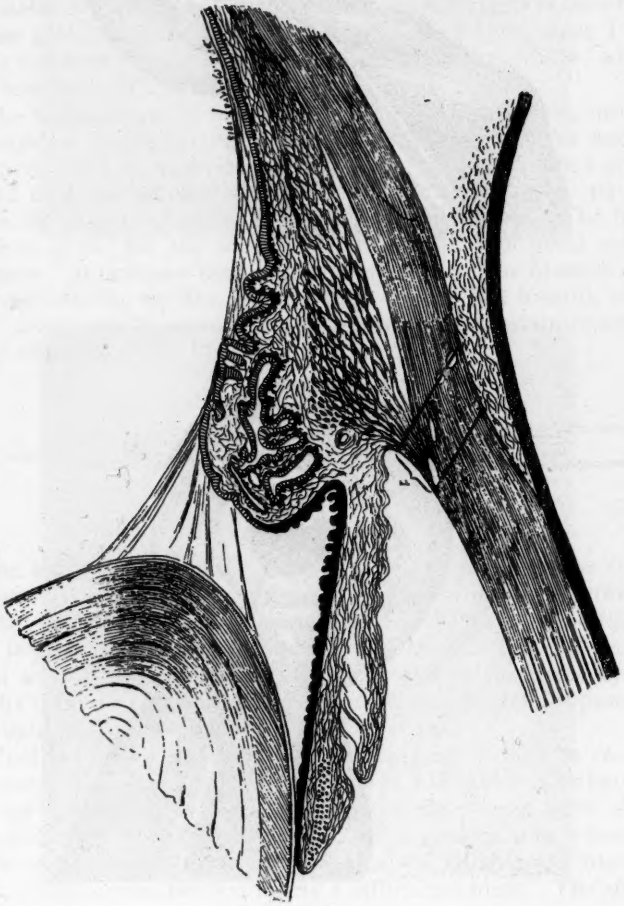

FIG. 2.

3. The incision should not be wide enough to permit the vitreous to escape.

If operating on the left, for example, puncture should be made near the one o'clock point, about 2 millimetres behind the limbus and thus in purely sclerotic tissue. The tip of the knife should be advanced toward the anterior chamber, the centre of the pupillary orifice serving as the point of direction. The knife-edge

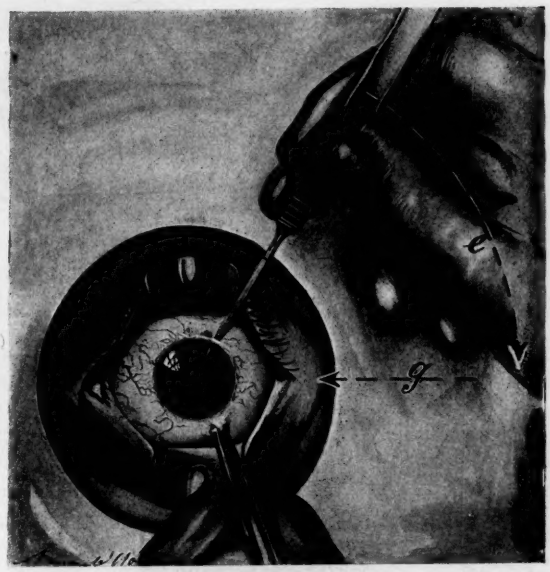

FIG. 5. Left eye.

is directed toward the sagittal axis of the eyeball and its flat side lies in a frontal plane. The knife is stopped as soon as its tip is visible in the irido-corneal angle and can work freely there (Fig 5). In this way the height of the scleral flap and the inclination required for forming it are quickly determined.

If the anterior chamber is effaced, as frequently happens in glaucoma, the handle of the knife must be lowered as soon as the knife appears in the anterior chamber, without engaging the tip as deeply as appears in Fig. 5.

The knife must now be turned. The back of the knife is supported as on a fulcrum and placed in line with an axis perpendicular to the sagittal axis of the cornea by slipping it into the irido-corneal angle as into a sheath, below the projection formed

by the scleral bevel. The flat posterior surface of the sclerotome is thus, so to speak, placed upon the iris, while the edge is at the bottom of the irido-corneal angle which it gently touches before sectioning the tendon of the ciliary muscle. It is now only necessary to push the knife in this same direction, the left hand remaining firmly fixed, in order to make a counter-puncture at a point symmetrical with that where the original puncture was made

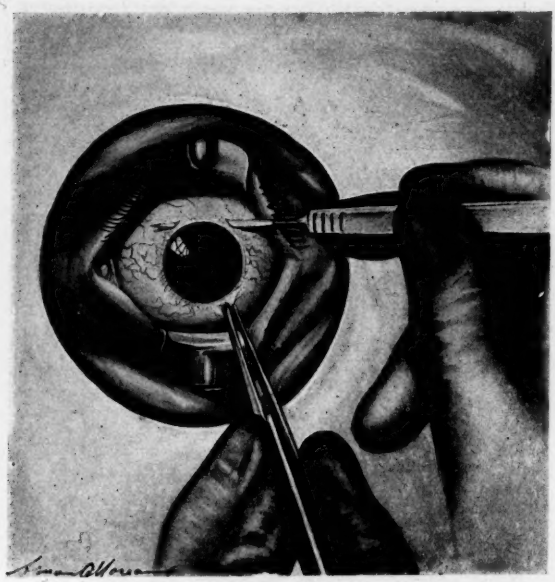

FIG. 6. Left eye.

(Fig. 6). Should the counter-puncture be made at the limbus, for fear of emerging too far backward, the result is of no importance, as we shall see.

A moment for halting has now arrived. The anterior chamber is punctured and counter-punctured and must be allowed to empty itself slowly, the more gently in proportion to the hardness of the eyeball and with the patience necessary for doing good work. The subconjunctival spaces become oedematous and it will be presently impossible not to dissect out a good conjunctival flap.

When this brief stage of arrest is completed, the scleral flap is formed by a slight sawing movement. The scleral wound now gapes, its lower lip constituting the apex of a flap whose height

has just been determined by the position of the puncture. This line of incision in the sclerotic makes an incurved sweep above the limbus which is parallel to the latter if the counter-puncture has been symmetrical (Fig. 7), and less parallel if the counter-puncture was made at the limbus (Fig. 8). However, the scleral crescent is always high enough because its height was determined by the site of puncture made in the first stage of the operation.

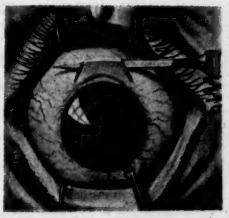

FIG. 7.

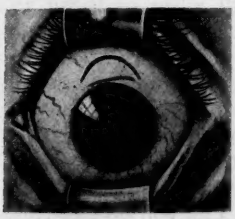

FIG. 8.

It is now only necessary to form slowly a conjunctival flap and to lift it with an iris forceps in order to resect beneath it one fragment or more of the sclerotic. These fragments are narrow and removed in a direction parallel to the limbus with the punch of the modified Vacher type (Fig 9). This Vacher punch is intended for resection of the iris and cannot section the sclerotic.

Sclerectomy as thus performed is easily completed by peripheral or total iridectomy. It is not ill-timed to stress this completion

FIG. 9.

for, though scleral iridectomy as devised by von Graefe is a classical procedure, it has certain details in this case which depend upon the form and the supralimbic site of the scleral flap, which is *exclusively scleral.* These points distinguish it from the effect obtained with the corneo-scleral incision of von Graefe. 1. Iridectomy is a classical procedure in acute glaucoma. 2. It is not indispensable in some forms of chronic glaucoma. 3. Iridectomy may be performed by simultaneous section of the scleral crescent,

between the same jaws of the forceps. 4. Care should be taken to grasp the iris without groping for it in the anterior chamber. 5. If iridectomy is not done, the only thing risked is a well-protected subconjunctival strangulation of the iris, or iridencleisis. Such are the points which I wish to stress.

(*a*) The beneficial effects of the von Graefe iridectomy are never absent from the mind in all treatment undertaken for combating glaucoma. Although the results obtained with simple sclerectomy, and still more so those secured by iridectomy done in cases of chronic glaucoma not relieved by the iridectomy of von Graefe, permit iridectomy to be separated from the other procedure concerning the indications and principles, it is prudent to do both while the patient is on the table. Besides, iridectomy is really the complement of sclerectomy, because it avoids the risks of strangulation and thus greatly simplifies the post-operative conditions.

(*b*) The von Graefe iridectomy does not appear to be absolutely necessary in chronic glaucoma for the reasons which I have indicated and also in cases where the iris is atrophied. Atrophy of the iris occurs frequently in senile glaucoma and the partial "sympathectomy" practically constituted by antiglaucomatous iridectomy is no longer justifiable here because it can deal only with degenerated tissue.

Still another circumstance should cause the operator to desist from devoting an entire operative stage to frank resection of the iris with the cutting forceps. It consists of the partial iridectomy which is sometimes effected involuntarily, when the pectinate ligament is divided during the formation of the scleral flap. At this moment the knife is fixed between the points of puncture and counter-puncture (see Fig. 6) and its flat surface lies upon the anterior aspect of the iris. On account of its location, the knife cannot fail to divide the pectinate ligament and thus open access to the margin of the supra-choroidal space of Schwalbe, but it thus also touches the base of the iris and carries away a short fragment in the area of the scleral incision.

This part of the irido-corneal angle must be carefully inspected before entering the iris forceps toward the anterior chamber, for it has occurred that an orifice has been made at the base of the iris through which the iris forceps or hook might be caught and injure the lens. As a matter of fact, experience and habit permit one to perceive the possibility of such a breach in the iris and to note, before verifying the fact, that the knife has made a "peripheral iridian opening in the angulo-cameral region" and that there is no need to complete the iridectomy. When the iris is intact, it becomes almost always prolapsed during the manipulations of the scleral resection and thus becomes engaged in the scleral incision, as shown in Figs. 10, 11 and 12.

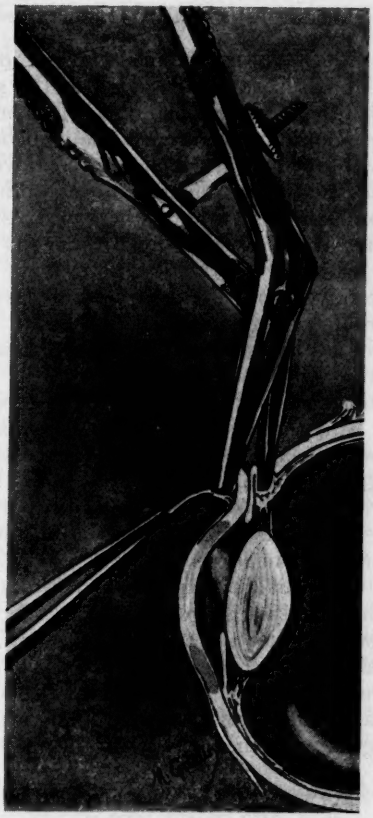

FIG. 11.

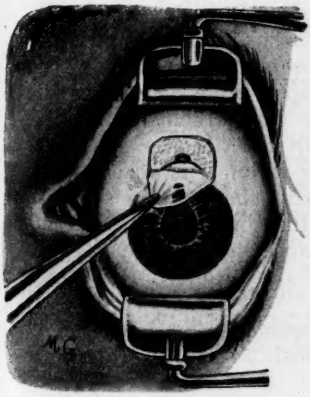

FIG. 10.

FIG. 12.

Drawings from life by Dr. Guélin.

(*c*) In half the cases, iridectomy may be done along with sclerectomy. The iris becomes engaged in the scleral wound as a tiny black ball at the moment when traction upon the conjunctival flap places the scleral crescent and the subconjunctival tracts between the jaws of the punch which are to remove them (Fig. 10). Under these conditions, the punch removes both the iridian prolapse and the scleral crescent, together with its subconjunctival attachments (Fig. 11). A drop of the aqueous humour escapes simultaneously with the contraction of the iris sphincter which has not been sectioned and reveals a more or less wide peripheral iridectomy, completely accomplished at the site of election (Fig. 12). The iridectomy thus obtained may be *total*, in which case the result is entirely satisfactory.

(*d*) When the iris is not thus frankly strangulated in the scleral incision and thus favours *iridosclerectomy*, occurring at the actual performance of sclerectomy, it is necessary to make sure, before inserting the iris forceps or hook into the space formed by the scleral resection, as I have remarked, that the knife has not clipped off during its passage a bit from the base of the iris when the pectinate ligament is divided. It is also necessary to make sure that the iridian prolapse, which would occur so opportunely before the operative stage devoted to scleral resection, does not occur afterward under the action of pressure inevitably made upon the eyeball during the manipulations. The iris forceps can easily grasp, at the bottom of the space formed by the scleral resection, a small iridian prolapse without engaging in the anterior chamber for grasping the iris with the object of doing an iridectomy.

(*e*) The operator may be prevented from combining iridectomy with sclerectomy through bleeding or because of lack of co-operation on the part of the patient. In such an event, post-operative strangulation might very probably be avoided by instilling eserine after operation, but should it not be avoided the sclerectomy performed would be accompanied by iridencleisis. This result is not very regrettable, especially if care be observed to *release* the subconjunctival and adherent iridian prolapse three days after the sclerectomy. Local anæsthesia is very carefully instituted and then, by dissection, the conjunctival flap covering the space left by sclerectomy and the strangulated iris within it is raised. The dome of the strangulation is then gently touched and incised with the knife. There is no need to suture the conjunctival flap thus dissected at the site of the iridian prolapse, nor should the galvanocautery be applied to the prolapse, since cauterisation closes fistulae.

I have presented these points, and especially this latter detail, in order to show that failure to accomplish a sclerecto-iridectomy

as just described does not necessarily militate against a useful result. I desire also to point out how this operation associates in a synthetic way successive procedures which have all been accepted by competent operators.

1. First, puncture is performed and then completed by sclerotomy, as devised by de Wecker, which may be further supplemented by the scleral iridectomy of von Graefe.

2. Fistulisation, the real and original object, is obtained by simple scleral resection at a site physiologically adapted to it.

3. Iridectomy is associated with it because it is classical and easy. If it is not done, a post-operative iridian strangulation may be resected, but such a subconjunctival iridian strangulation, if well covered, adds to the operation of Felix Lagrange the essential character of iridencleisis, a procedure which has its adherents. I do not advise this, but if an iridian strangulation is formed after simple sclerectomy, it is necessary, as soon as the strangulation has been completely formed, and is well adherent, to dissect the conjunctiva and then open the dome of the iridian prolapse. In this way the strangulated and adherent portion of the iris may help to serve as an endothelial sheath for the fistulous scleral orifice.

The operation is thus easy, clearly marked and rendered as *external* as possible and one which the beginner may terminate at any of its stages with the consolation of having at all events done a classical anti-glaucoma operation. Puncture, sclerotomy, iridectomy and even accidental iridencleisis, such are the stages, and the only risk incurred by an operation which never directs the axis and weight of an instrument toward the ciliary body, which is entirely performed at the apex of the cameral angle through an incision so small that nothing can become engaged in it save the iris, and so well placed that there is no risk of a corneal resection, which could only be an ineffective and poorly defended caricature of the scleral resection. "*Do not touch the cornea, for it proliferates, and do not touch the ciliary body, for it is resentful*"—such is the verbal tradition inspiring this description.

The fistulising treatment may thus be accomplished by three operative methods, namely, simple limbic sclerectomy, sclerectomy with peripheral iridian opening, and sclerecto-iridectomy.

(*c*) *Results.*—From results recorded statistically which refer only to cases actually operated upon and followed up for at least one year, the conclusion is sincerely warranted that the fistulising method succeeds in 85 per cent. of the cases in chronic glaucoma, while iridectomy yields an average of 25 to 30 successes per hundred, according to the best statistics.

Rather than depending upon personal records of a single operator and a uniform technique, the recent thesis by E. Joseph[9] should

be consulted, entitled "The remote results of anti-glaucomatous operations." This thesis presents the results obtained in various major hospital services by different surgeons of differing experience and offers the following conclusion: "*When medical treatment fails to render the tension normal and to prevent even the slightest diminution of the functional value of the eye, it is necessary to employ sclerecto-iridectomy and operate as promptly as possible, however the visual functions be affected at this time.*"

It is important to devote special attention to the failures, since they supply the most instructive facts.

Operative accidents are negligible. The technique of subconjunctival and limbic scleral resection, if the precaution is observed to avoid previous dissection of the conjunctiva, which should be respected because it is the only covering of the scleral orifice, *does not risk early or late infection,* which has occurred following trepanation done with the instruments devised by other operators for the operation of Felix Lagrange. Personally, I *never* have late infection of the scar.

True and really unavoidable failures, whose percentages are of 5, 10 or 15 according to the results recorded by different writers, are due to lesions in vessels of the retina or in the optic nerve which are degenerative and whose progress cannot be stayed when decompression is accomplished too late. If delayed for too long a time, restoration of the normal ocular tension and tonus may be powerless to arrest progressing optic atrophy.

Here may be grouped the cases in which the patient presents good or excellent visual acuity (often monocular) and a visual field whose nasal or inferior limit lies close to the fixation point. In such cases, the condition which menaces the fixation point cannot remain stationary if the ocular tension remains high, or perhaps even if it be rendered normal. When miotics prove insufficient under these conditions, the rule is to take the chances and operate. It is necessary, however, to inform the patient or those who are responsible, that operation is thus undertaken as a last resort, that it risks marked contraction of the visual field with destruction of central vision, and that it may therefore fail.

The good results have been so frequent that they have reversed the statistics and given 80 per cent. to 90 per cent. success instead of a corresponding proportion of failure. They are likewise instructive and lead to the same conclusion that "*it is necessary to operate without delay in cases of glaucoma in which medical treatment fails to reduce the ocular tension to normal limits and operation is necessary even if the medical treatment does reduce the tension to normal should alteration of the visual field progress in the slightest degree or should visual acuity decline.*"

Felix Lagrange announced his method on June 8, 1905, at a meeting of the Society of Medicine of Bordeaux. In October, 1905, he described, at the French Congress on Surgery, a " new procedure for the treatment of chronic glaucoma by the formation of a filtering scar," basing his paper on the results obtained in fifteen cases treated by this method. " One of these cases," he stated, " was operated upon two years ago (in 1903) and two others were treated eight months ago." The thirty-third anniversary of this discovery has now arrived, and I have thought that it might be of interest to recall, on this occasion, the principles of a surgical method so largely honoured by time, and to give the details of our present technique, notably because the latter has preserved all the features claimed to be essential at the earlier period and has proved and tested the soundness of their physiological and physio-pathological basis.[10]

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THE USE OF RADON IN THE TREATMENT OF METASTATIC CARCINOMA OF THE CHOROID

BY

P. JAMESON EVANS

BIRMINGHAM

THE case described is unusual in the development of metastatic carcinoma, secondary to that of the breast, in both eyes, in the one two months before the other. The first eye was excised, the fellow eye at that time being normal, and the second treated by the application of radon seeds.

N.D., aged 41 years, female, first attended the Birmingham and Midland Eye Hospital complaining of a foreign body in the left eye on December 16, 1935, when vision was: R. 6/6, L. 6/9. (i) There was some conjunctivitis of the left eye but no foreign body was found. On January 6, 1936, the patient complained of defective left vision of about ten days duration, and was found to have (LV) less than 6/60. A pale exudate was seen in the fundus of the left eye situated to the nasal side of the disc, extending from the disc outwards. This continued to increase slowly in size

FIG. 1.

Choroid of Left Eye.

for a fortnight. It was not till then that the history was elicited of the removal of the left breast for carcinoma in 1932. The condition in the left fundus was then considered to be probably a metastatic growth and, accordingly, the eye was excised on January 27 (*Fig.* 1).

The pathological report on the specimen runs "secondary adeno-carcinoma." Vision in the right eye was at this time 6/6 and the fundus appeared normal.

On March 9, 1936, the patient was seen again complaining of mistiness of vision in the right eye. Vision was 6/36, and examination showed a large, pale, flat detachment spreading from the

FIG. 2.

Microscopic section of growth in left eye.

optic disc downwards and outwards, below the line of the inferior temporal vessels of similar appearance to that seen in the left eye prior to excision. The patient was transferred to Queen's Hospital, Birmingham. Upon admission on March 10 vision in the right eye was 6/60 or less, and it was decided to give an application of radium emanation.

On March 23, 1936, the following operation was performed on the right eye.

The eye was prepared as for a diathermy operation for detached retina. The conjunctiva was cut in a semicircle below from 3 o'clock to 9 o'clock and resected widely. The inferior rectus muscle was secured and cut, the posterior end being retained on

a catgut suture. The lower half of the sclera was then exposed. Four radon seeds, having an initial activity of 1.72 millicuries each were stitched to the sclera; two were placed twelve millimetres back from the limbus and ten millimetres apart, on each side of the inferior rectus, and two fifteen millimetres back and eight millimetres apart. A second thread for the purpose of withdrawal was attached to each seed and brought out through the

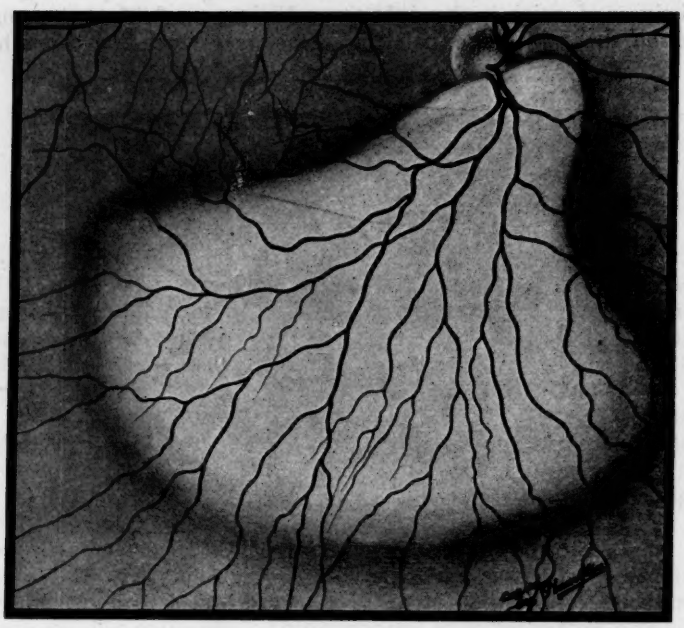

FIG. 3.

Drawing of right fundus before operation. March 20, 1936

conjunctival wound, while the scleral sutures were brought forward through the lower lid and tied off in pairs, inner and outer, over thin rubber tubing. The inferior rectus was then re-sutured in its previous position, and the conjunctival wound closed. At the end of a week the radon seeds were removed without re-opening the wound. Healing was uneventful.

On April 17 vision was slightly improved but no change could be seen in the fundus picture. On April 24 right vision was 6/12 full. On May 8 there were seen four areas of degeneration in

the growth, like gaps in a mist, corresponding to the positions occupied by the four radon seeds.

On May 29 vision with $\frac{-0{\cdot}50}{0{\cdot}50}$ was 6/6 full.
$\downarrow 90$

The eye movements were full and there was no drag on the conjunctival scar. The retina was entirely flat, the yellow growth having disappeared, but there was widespread choroidal reaction with pigmentation, which appeared to be spreading in all directions and involved the macular area. This change in the choroid continued to spread, finally reaching the line of the superior temporal retinal vessels above, and extending below out of view towards the ora serrata, while laterally the extension was approximately from 4 o'clock of the cornea to 8 o'clock. On June 4 the right field for $\frac{1}{2}^{\circ}$ white at 1/3 metre was perfectly full and vision was 6/5 part with glasses. The fundus picture was unchanged, the area affected showing much stippling of pigmentary change in the

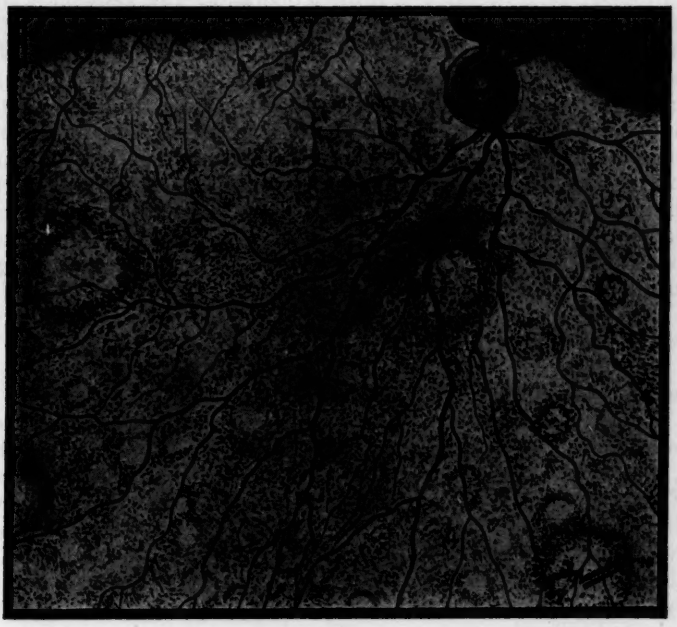

FIG. 4.

Drawing of right fundus, post-operative. June 4, 1936.

choroid. No trace of growth was to be seen. On September 14 the ocular condition was unchanged, but the patient complained of loss of weight and pain down the left arm, and had had two attacks of vomiting each lasting four or five days.

On re-examination on October 15 vision in the right eye was still 6/6 partly, but a fresh patch of new growth was seen adjacent to and continuous with the upper and outer margin of the disc and spreading outwards under the superior temporal vessels.

It was decided to repeat the previous insertion of radon seeds, approaching this time from above and from the outer side. On October 21 the area of growth which, on October 15, measured some five by three mm., was again examined and was seen to have extended greatly. Downwards it had reached the macular area and was infiltrating the choroid previously pigmented; to the inner side it extended to about 2 o'clock of the disc and from thence upwards in a curve running temporally to the upper margin which appeared to be about two disc diameters from the periphery of visible retina; to the outer side the growth had practically reached this limit. At this time vision was probably not more than 3/60. On this day a further operation was performed, the exposure being from the outer and upper side. The external and superior rectus muscles were identified and cut to assist exposure. Three radon seeds of an initial strength of 1·79 millicuries each were then stitched to the sclera 15 mm. behind the limbus; one to the nasal side of the superior rectus; one to the temporal side and behind the insertion of the superior oblique; and one to the outer side and below the insertion of the superior oblique. The threads were maintained in a state of moderate tension by being brought forward through the upper lid and tied round thin rubber tubing, the second threads being again brought out through the conjunctival wound.

The cut rectus muscles were re-sutured and the conjunctival wound closed by an interrupted suture.

On October 27, after six days, the radon seeds were removed as before. Healing, though slow, was uneventful.

The patient's general condition was now very much worse, there being great loss of weight and incessant vomiting. On December 4, vision had improved to 6/18, and there was a characteristic lack of definition of the growth and the beginning of visible pigmented choroidal reaction. On December 18, vision was still 6/18 and the retina was quite flat, all trace of choroidal growth having disappeared. The whole fundus background was pale and mottled by the pigmentary reaction of the choroid and the disc was rather pale. Evidently the area affected by irradiation completely involved the macula.

On January 1, 1937, vision was 6/12 (i) and the retina was

entirely flat. The general condition of the patient was also temporarily improved and during the previous month she put on two pounds in weight.

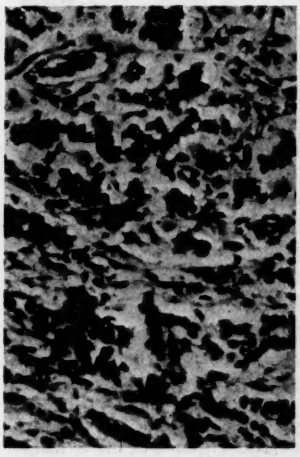

FIG. 5. Breast, ×230.
(By courtesy of Dudley Road Hospital)

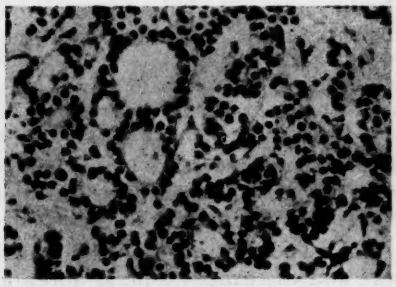

FIG. 6. Axillary Gland, ×230.
(By courtesy of Dudley Road Hospital)

FIG. 7.

Metastatic carcinoma of choroid of left eye.

By courtesy of the authorities of Dudley Road Hospital and of the pathologist there, I have been able to compare the sections of the tumour of the breast, with that in the axillary glands and the choroid. The original tumour (Fig. 5) was of a scirrhous type: while that in the axillary glands was not of very great activity (Fig. 6). The tumour in the eye (Fig. 7) on the contrary was more active as is shown by the rapid increase in size and the very favourable reaction to radon therapy.

In spite of evidence of further metastases the patient remains remarkably well in general condition and, although losing weight, is still active nearly five years after the original operation on the breast, and still retains good vision twelve months after the incidence of choroidal metastasis in the sole remaining eye.

Summary

The features of interest in this case are briefly these:—

(*a*) The occurrence of bilateral metastatic carcinoma of the choroid during a period of three months, two months elapsing between the incidence in the left eye and that in the right eye.

(*b*) The confirmation of the pathology in the case of the left eye and the exactly similar appearance of the right eye at a later date put the diagnosis in the second eye beyond doubt.

(*c*) The method of application of radon seeds to the sclera.

(*d*) The latent period, following the operation, of some two or three weeks before much appreciable change in the appearance of the growth took place; the progressive nature of this change over some two months; the widespread choroidal reaction which also was progressive for about the same period.

(*e*) The complete replacement of the retina upon the disappearance of the growth with full return of the visual field and of visual acuity.

(*f*) Absence of any sign of recurrence in the eye over a period of seven months.

(*g*) The successful application of radon a second time resulting again in disappearance of the tumour.

(*h*) The gradually increasing glandular character of the metastatic growths as compared with the primary breast tumour.

FAMILIAL MACULAR COLOBOMATA

BY

P. JAMESON EVANS

BIRMINGHAM

THIS report deals with five cases of this condition, four brothers and a sister. The family history originates in the Channel Islands where the maternal grandfather of the affected persons was said to have had defective vision for many years, a somewhat inadequate history but interesting notwithstanding. Of this family several branches are still resident in the Channel Islands and the south of England, and three cases of defective vision are vaguely recalled by members of the family but the opportunity has not yet occurred to examine them. Be that as it may the daughter in question, unfortunately deceased without having been examined ophthalmoscopically, certainly had defective vision from her early days. By her first marriage she had a daughter, who in turn had a son and a daughter. These three present no abnormality of the fundus. In a second venture she married Mr. G. and had four daughters and a

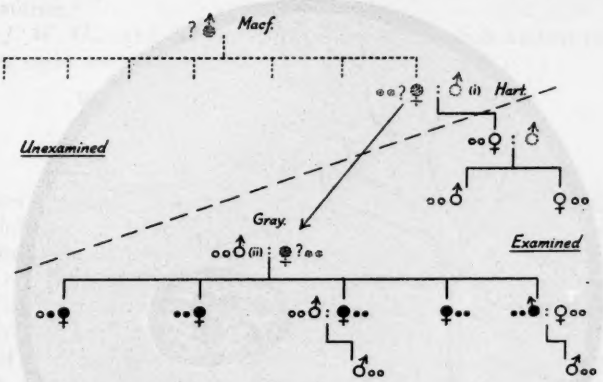

FIG. 1.

Table of family of Gray.

son. Of these the eldest has only a unilateral coloboma while all the others are bilaterally affected. Of the females three are married, but only one has a child, a male, whose fundi are normal. The male member of the family has also an infant son, who presents no abnormality.

The whole subject of macular coloboma has been admirably and recently reviewed bv Sorsby so it will be enough to state briefly the actual findings in the family now under discussion :—

J. W. G. Father: normal maculae, vision 6/12 in each eye without glasses. Some retinal arteriosclerosis was present and there was oedema of the lower lids and ankles. He died in 1934, aged 76 years, from cardiac failure, leaving four daughters and a son.

(i) ***Mrs. A. P.***, aged 56 years. Has never noticed any defect of vision. Vision 6/6 in each eye without glasses. Refractive error small degree of myopia. The left fundus is normal; the right shows a typical macular coloboma about $1\frac{1}{2}$ D.D. in horizontal extent and about one disc diameter vertically. The fovea would appear to be placed towards the inner limit of the coloboma. No other ocular abnormality was found. She has had no children.

(ii) ***Mrs. C. W.***, aged 51 years. Has had defective vision since childhood.

Vision: Right 6/36 $\bar{c}$ $+1{\cdot}25$ $+4{\cdot}50 \rightarrow 180$ Left 6/18 $\bar{c}$ $+1{\cdot}75$ $+3{\cdot}0 \rightarrow 180$

The patient shows a slight rotary nystagmus. There is bilateral macular coloboma measuring about $1\frac{1}{2} \times 1$ D.D. in each eye, the long axis horizontal. On examination on the Gullstrand ophthalmoscope the coloboma is seen to consist of a sharply excavated

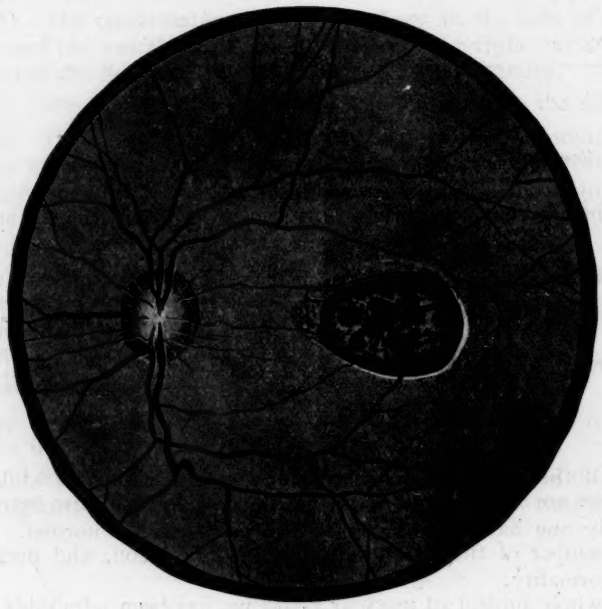

FIG 2.

Drawing of left fundus. (C. W.)

area, the actual edge of the retina slightly shelving. In the centre of the degenerated area the black pigmented masses are slightly raised. No retinal vessels are seen running over the coloboma but small arterioles appear to dip into it. The excavated area is not so pigmented in its peripheral parts but there is further pigment in excess immediately surrounding the hole. Her husband, and son (aged 17 years), present no abnormality.

(iii) *Mrs. B.*, aged 46 years, realised her vision was poor when very young.

Vision: Right 6/12 $\bar{c}$ −2·0 Left 6/36 $\bar{c}$ −2·0

The patient presents an almost identical fundus picture with that of the previous sister, except that in both eyes the coloboma is rather larger, measuring about 2 × 1½ disc diameter in each eye. In other respects the eyes appeared normal. She has no children.

(iv) *Miss G.*, aged 42 years, discovered her visual defect at the age of eight.

Vision: Right $\bar{c}$ −1·50 = 6/60 Left $\bar{c}$ −1·50 = 6/36

She has a divergent strabismus of the right eye of 20°. She shows bilateral macular colobomata, measuring some 2½ × 2 disc diameters, and the fovea appears to be close to the centre of the coloboma in each instance.

(v) *J. W. G.*, aged 39 years, the only brother, has known of his defective sight since childhood.

$$\text{Vision: Right } \bar{c} \frac{-3{\cdot}50}{+2{\cdot}0} \rightarrow 180 = 6/36$$

$$\text{Left } \bar{c} \frac{-4{\cdot}25}{+0{\cdot}75} \rightarrow 180 = 6/18$$

He shows bilateral colobomata but apart from this no abnormality. The coloboma in the right eye is diffusely pigmented by black interlacing strands which completely fill the excavation, but in the left eye the pigmentation is chiefly limited to the outer third of the hole. The position of the colobomata is such that the fovea would be involved in each eye. Vision in the left eye is good enough to permit of reading and for the patient to have become a clergyman. His wife, and son (aged two years), have normal fundi.

(vi) *Mrs. G.*, the mother, appears to have had bad sight for most of her life but died before this investigation was initiated. By her first marriage she had one daughter, whose eyes are normal. The latter in turn has a son and a daughter who present no abnormality. For this information I am indebted to Dr. Thompson and Dr. Starlberg. Unfortunately it has been impossible as yet to seek out the other members of the families in the Channel Islands but it is hoped to do so at a later date.

In this family no other physical defects of the limbs, etc., have been found and, apart from the ocular conditions, all these persons are normal.

Summary

The condition of familial macular coloboma is found in five members of a family.

The next generation so far shows no similar defects. The previous generation unfortunately cannot be fully investigated but the suggestion is that the defect in this family derives from the maternal side. Further observations in the side branches on this side of the family may possibly provide instances of the same defect.

EYELASH IN THE ANTERIOR CHAMBER FOLLOWING THE REMOVAL OF AN INTRA-OCULAR FOREIGN BODY

BY

W. J. B. RIDDELL

GLASGOW

THE interest of this case lies in the possibility that the eyelash entered the eye after the removal of an intra-ocular foreign body. The patient was a man aged 19 years, who received what he assumed to be a trivial injury to his left eye at his work in July, 1936. Shortly after the accident he went on holiday and discovered that the vision in the eye was failing. I saw him early in August, 1936, for the first time. The right eye was normal and has remained so. The left eye was white and showed no sign of inflammation and was not injected. In the central area of the cornea there was a small healed punctured wound. The anterior chamber was of normal depth, the pupil was active and the iris showed no sign of injury. A traumatic cataract was present and in the lens substance a small metallic foreign body was seen. The vision was reduced to hand movements. He had no pain and regarded the injury as trivial until he noticed the sight failing.

On August 12, 1936, the foreign body was removed through a straight keratome section by means of a hand magnet. A guarded speculum was used and no instrument entered the eye except the straight keratome. Before the section was made the foreign body was brought forward through the lens substance but could not be got into the anterior chamber because the wound in the lens capsule had sealed. Consequently a small opening in the capsule was made with the point of the keratome before withdrawal. This opening was several millimetres below the section and no capsule was drawn up. The section was made without loss

of aqueous. The foreign body was easily removed. The conjunctival sacs were irrigated before the operation but not afterwards. The method employed followed that described by Whiting and Goulden[1] and no iridectomy was required.

Progress was uneventful for a day or two. From the third day onwards a violent reaction developed. This was more marked than could be accounted for by the swollen soft lens matter which had come forward. On August 19, a paracentesis was performed. This did not improve matters and the eye remained red and painful. The question of excision was considered seriously but towards the end of the month the eye was beginning to settle down. The anterior chamber contained masses of yellowish soft lens matter. The patient was discharged from hospital on September 14. In October, 1936, the lens matter had absorbed sufficiently to permit of detailed examination. The vision with a plus 11·0 D.sph. was 6/24 and fundus details could be seen. In the lower part of the anterior chamber, lying horizontally upon the surface of the iris an eyelash was observed. The eye remained quiet and in January, 1937, the vision was 6/18 with an aphakic correction. There is no gap in the posterior capsule. He has had no more pain or discomfort and the vision has been maintained (May, 1937).

The patient had very luxuriant eyelashes which fell out readily and were frequently noticed on his dressings. I am of the opinion that a loose eyelash, lying unobserved in the fornix entered the eye after the removal of the foreign body and before the keratome section had time to seal up. If entry had been effected at the time of the accident some inflammatory reaction would have been expected. There was none. Both before and during the operation the eye was under close scrutiny by myself and my assistant; nothing untoward was observed. Apart from the necessity of making an opening in the anterior lens capsule when the section was made, the case did not differ from many others which I have had to operate upon since my apprenticeship in these matters at Moorfields. This patient was shown to the members of the Scottish Ophthalmological Club in October, 1936, and the majority of opinion was in favour of leaving the eyelash alone. This view is confirmed by some of the cases quoted by Savin.[2]

A fortuitous intra-ocular eyelash is an uncommon occurrence and is a possible cause of obscure post-operative inflammation.

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ANNOTATION

Standards of Visual Acuity in Industry

The question of eye sight in industry is one to which increasing attention has been devoted of late years. No one can dispute the proposition that, other things being equal, the employee with perfect sight will be in a better position for doing work than one handicapped by visual defects. But, to insist on a 6/6 standard would be Utopian, and were such a standard rigidly enforced grave injustice would be done to many perfectly competent workpeople. The Royal Navy has for many years demanded a high standard of vision and rightly so; but it is to be noted that it is only 143 years since Nelson's eye became blind. This did not invalidate him or prevent him from winning most of his famous sea battles.

An agricultural labourer who has to pleach a hedge, clean out ditches or scythe a meadow obviously does not need so high a standard of vision as the driver of an express train or one who has to work on scaffolding, yet all are engaged in industry.

It seems to us that what is needed in this question of eye sight in industry is to try and establish minimum standards for the various branches of industry. Such standards, recorded by Snellen's test types, would need to be on a sliding scale and some latitude would be permissible in the various trades. Mrs. Gamp once laid down the law that use is second nature; and in our opinion there are probably many cases where long experience in any particular work may well outweigh some degree of visual defect.

A case in point is that of a gardener of our acquaintance. His visual acuity is very bad owing to tobacco amblyopia and his dislike to giving up tobacco. Yet he can see to clip a hedge quite well and he is first-class at digging a bed and maintaining a level. His greatest trouble is to decide between what are weeds and what are young plants.

Let us consider for a moment the standard of vision demanded by the regulations for motorists in this country. Judged by Snellen's types this works out at between 6/18 and 6/12, with or without glasses. Let us call it 6/12.

If a medium standard of this sort is deemed sufficient for fast moving traffic on the roads, what should be the standard on the railways where traffic is running on lines confined to a track and where little else should be moving?

Express drivers obviously need a high visual acuity. If we were asked to set a standard for such men we would suggest a minimum standard of 6/9 binocularly, allowing one eye to be 6/12. The

drivers of fast goods trains should we think conform to the same standard, but those of the slower goods trains might well be passed on a minimum of 6/12 binocular standard. Coming to men who work on the line it seems to us that the standard might well be much lower and we would suggest a binocular standard of 6/24 or better for plate-layers. The eyes must be healthy apart from errors of refraction and the fields must show no gross defects. And here we meet the difficulty that with increasing years the sight of hypermetropes diminishes. A lad of 16 years of age with 3 or 4 dioptres of hypermetropia will easily pass the 6/6 standard as a rule. When he gets to the age of 50 years his unaided vision will be nothing like so good. But by this age he will probably have spent close on 30 years at his job and presumably knows it thoroughly. It would be very hard lines were he to be dismissed from his post simply on account of failure of accommodation.

So far as we are aware the railway companies do not allow their employees to wear glasses at work. This restriction is quite correct in the case of drivers, where the lenses might easily become clouded by rain, steam from heat in the cab, and other causes. But for most other types of railway men we see no reason why glasses of the non-splintering type should not be allowed; and we think that the authorities might reasonably relax their regulations in this respect.

In connexion with the point made about scaffolders we remember a middle-aged man who got a detachment of the retina in one eye. The other eye was moderately myopic, with corrected vision of 6/9 part. The vitreous was full of opacities and very fluid and we looked upon him as very likely to get a detachment in the other eye at some later date. We advised that he should be taken off scaffolding work and found employment on the ground. A couple of years or so later we heard that he was still at work as a scaffolder.

Doubtless it would be a formidable task for any committee to define minimum standards of visual acuity that would cover all branches of industry, but we cannot help feeling that the appointment of such a committee would be a good move. And we believe that many employers of labour would be willing to appoint representatives to give evidence on special points which might arise. Of course it would not be easy to overcome the age-long distaste of the average workman for wearing glasses at his work; but time would almost certainly tell in the long run in such cases.

ABSTRACTS

I.—CORNEA

(1) **Filatov, V. P. (Odessa).—Transplantation of the cornea from preserved cadaver's eyes.** *Lancet*, p. 1395, June 12, 1937.

(1) **Filatov** comments on the need for new sources for corneal transplants. In the U.S.S.R. according to the official census there are 234,800 blind persons of whom 43 per cent. have lost their sight from leukoma. Whilst many of these are unsuitable for keratoplasty on account of other ocular complications there are thousands who would benefit to some extent by this operation. As there is an insufficient number of eyes available in living persons for keratoplasty the author has experimented with transplants cut from the preserved eyes of cadavers. Death from infectious disease, malignant neoplasms and the presence of syphilis detected by serological examination were regarded as contra-indications. The enucleated eyes are placed in a sterile jar with a tight fitting stopper, the cornea being upwards. In some cases the jar was filled with the cadaver's fresh clotted blood and in others this blood was citrated. The jars were kept in an ice chest at 4°—6° C and on the day of operation the jar containing the eye was surrounded by ice and brought into the theatre, where it remained about one hour before the corneal transplant was cut. The cornea appeared somewhat dim and the epithelium stippled. The cornea was washed with a fresh aqueous solution of brilliant green 1/1000 before the graft was cut. Some of the eyes had been preserved for periods varying from 10—56 hours and in one case 6 days. The author's impression is that the results of transplantation from cadaver's eyes are not inferior to those obtained with grafts from living eyes but he comments that before a final opinion can be expressed it will be necessary to follow up the more remote results. According to the photographs illustrating this paper the results in some cases are remarkably satisfactory. Ninety-five operations were performed, in 46 of these there was non-transparent union, in 17 cases "half transparent union"; 4 had transparent union (in one of these the transplanted cornea had been preserved for 6 days) but later fibrous connective tissue formed in each case on the posterior surface of the transplant; 18 had transparent union and details of the anterior chamber could be made out clearly at least through a part of the transplant or there was a good light reflex through it. Fourteen of these 18 cases had been observed for over 9 months.

H. B. STALLARD.

(2) **Tizzard, Spencer T. H. (Bath).—Corneal grafting (Keratoplasty), report of a case.** *Lancet*, p. 1106, May 8, 1937.

(2) **Tizzard** briefly describes the salient technical points in corneal grafting. He favours the use of a conjunctival flap to cover the entire cornea after the graft is placed in its bed. The conjunctiva is drawn over the cornea by means of a purse string suture. The author has introduced an additional technical point at this stage. A perforation is made in the conjunctiva sufficient to admit a repositor. Whilst the purse string suture is being drawn taut and tied a repositor dipped in oil is inserted through the perforating wound in the conjunctiva and is slid on to the anterior surface of the graft thereby retaining it in position whilst the conjunctival covering is completed and the purse string suture tied.

H. B. STALLARD.

(3) **de Grosz, S. (Budapest).—Aetiology and therapy of keratoconjunctivitis sicca. (Aetiologie und Therapie der keratoconjunctivitis sicca).** *Klin. Monatsbl. f. Augenheilk.*, Vol. XCVII, p. 472, 1936.

(3) **de Grosz** gives a summary of the writings of Sjögren on the symptom-complex known by his name: a chronic bilateral affection with remissions, chiefly seen in women past the menopause, and consisting of catarrhal conjunctivitis, photophobia, diminished visual acuity, mild ciliary injection, changes in the corneal epithelium as shown by fine filaments, diminished sensitivity of the cornea and lowered intra-ocular tension. Such patients are "unable to weep." Associated with these ocular changes are xerostomia (as also dryness of larynx and pharynx), atrophic rhinitis and arthritis. When rose Bengal is instilled into the conjunctival sac, the diseased parts of the conjunctiva and cornea do not stain, in contrast to the red healthy tissue. Histologically Sjögren showed hyaline degeneration of the conjunctiva, infiltration with plasma cells, local eosinophilia and mucoid degeneration of the epithelial cells of the conjunctiva and cornea. The lacrymal glands show atrophic lesions and lymphocytic infiltration is seen in the glands of mucous membranes. General disturbances are shown by anaemia with lymphocytosis, subfebrile temperature and metabolic changes. Sjögren regards the affection as a haematogenous gland infection. de Grosz records four cases of his own; in two pernicious anaemia was present, and in all four there was a diminished blood cell count. Carbohydrate metabolism was normal, and the author holds that whilst some cases are caused by an affection of the blood-forming organs, in others endocrine disturbances are to be sought—the onset after the menopause and the occurrence of arthritis being suggestive. He also suggests vitamin-deficiency as a cause. Treatment should be not only local, but along the general lines suggested by the associated lesions.

ARNOLD SORSBY.

(4) **Peppmüller, Fr., (Zittau).—A hitherto undescribed bilateral symmetrical subepithelial corneal opacity, in a case of Paget's osteitis deformans. (Ueber eine bisher nicht beschriebene beiderseits symmetrisch gelegene subepitheliale Hornhauttrübung bei einem Fall von Pagetscher Osteitis deformans).** *Klin. Monatsbl. f. Augenheilk.*, January, 1937.

(4) **Peppmüller** describes a grey-brown pigmentation of the cornea, which he observed for a number of years. It began at the temporal and nasal sides of the limbus, and spread slowly across the centre of the cornea. The pigment was subepithelial, and there was some opacity of the parenchyma immediately underlying Bowman's layer. Histochemical tests on small pieces taken for section, showed that the pigment was not melanin, calcium nor iron, but probably a protein substance formed by degeneration. The condition resembles that described by Lugli—"degeneratio sphaerularis elaoides," and may arise similarly from arteriosclerotic changes, or from some metabolic error associated with Paget's disease. It is interesting to note that the blood-calcium in this case was, if anything, below normal.

D. R. CAMPBELL.

(5) **Alajmo (Padua).—Diathermy in the treatment of conical cornea. (Un metodo personale, diatermocoagulazione, di terapia del cheratocono).** *Rass. Ital. d'Ottal.*, November-December, 1936.

(5) **Alajmo** uses diathermy to produce coagulation of the apex of the cone, but does not perforate the cornea. The flattening is noticeable at once. This increases during the next days. The scar left is small and dense and usually interferes little with vision. He gives the story of several successful cases.

HAROLD GRIMSDALE.

II.—LENS

(1) **Gifford, Sandford R. and Puntenney, Irving (Chicago).—Coralliform cataract and a new form of congenital cataract with crystals in the lens.** *Arch. of Ophthal.*, May, 1937.

(1) The term coralliform cataract was applied by Marcus Gunn in 1895 to a particular type of cataract in which many layers of lens in the axial area are affected by peculiar branching opacities. The lesion appears first in early foetal life, affecting the embryonic nucleus, subsequent areas of cortex being affected in their axial portions. **Gifford** and **Puntenney's** first case was a woman aged 28 years, who showed irregular stellate opacities extending from the

centre of the lens to the anterior and posterior capsule in each eye. The cataracts were removed, after preliminary discissions, by corneal expression and on examination were found to contain long needle-shaped crystals. These were insoluble in chloroform, alcohol and water, and were thought to be formed of a calcium salt, probably the sulphate. A second case showed a different condition. One eye had already been needled but the other showed a central opacity, surrounded by two zones composed of crystals. Microscopically these were found to be long, polyhedral needles, resembling the needle-like crystals of calcium sulphate. Quantitative analysis showed 0·6 per cent. of calcium in the moist lens matter, which is ten times the amount of calcium found in ordinary cataractous lenses. Calcium salts are not the only crystals found in cataract. Thus it has proved possible, by polarised light, to determine the presence of crystals of cholesterin and other substances and Kraiez claims to have demonstrated by this method the presence of lipoid crystals in 30 per cent. of normal lenses. Other substances mentioned are cysteine, compounds of tyrosine and crystalline forms of protein, like those found in certain plants.

F. A. W-N.

(2) **Purtscher, E. and Dibold, H.—Intracapsular extraction in diabetics. (Zur intracapsulären Starextraktion beim Diabetiker).** *Klin. Monatsbl. f. Augenheilk.*, January, 1937.

(2) A comparison of the metabolic state and the ophthalmic complications in cases of intracapsular extraction in diabetes, shows the following facts:—(1) The tendency to bleeding at the time of operation, particularly while making a flap, depends on pre-operative treatment with insulin on the decrease in blood-sugar, and on the presence of haemorrhagic changes in the retina, and is particularly brought about by low blood pressure. (2) Scattering of pigment in the anterior chamber is always to be expected in long-standing cases of diabetes. (3) Post-operative iritis is predisposed to by a high blood-sugar, *i.e.*, where the diabetic treatment has been defective, and by low blood pressure. (4) There is a high incidence of cases of hypotonia among diabetics, and they are more subject to iritis than normals. (5) In general the operation, recovery and final visual results are almost the same in diabetics as in normals.

D. R. CAMPBELL.

(3) **Averbach, M. (Moscow).—A note on expulsive haemorrhage. (Note sur l'hemorragie expulsive).** *Ann. d'Ocul.*, Vol. CLXXIV, p. 44, 1937.

(3) **Averbach** reports on three cases in which one eye had been lost by expulsive haemorrhage and which had to be operated on for cataract of the other eye. As expulsive haemorrhage is supposed

to be due to the bursting of branches of the long ciliary vessels in the suprachoroidal space. He has tapped this space by a 2 mm. trephine near the equator. The extraction of the cataract was performed immediately after the scleral trephining and was not followed by any untoward event. The author recommends preliminary trephining in all cases where there is reason to be afraid of an expulsive haemorrhage.

HUMPHREY NEAME.

(4) **Bakker, A. (Groningen).—On the importance of ascorbic acid (Vitamin C) for the metabolism of the lens. (Ueber die Bedeutung der Askorbinsäure (Vitamin C) für den Stoffwechsel der Linse).** *Arch. f. Ophthal.*, Vol. CXXXVI, p. 166.

(4) According to experiments *in vitro* made by **Bakker** the lens capsule is readily permeable to ascorbic acid both outwards and inwards, although it is not known whether it passes through in its reduced or oxidised form.

This acid, which is present in the lens in relatively high amount, varies in different animal species and at different ages and probably also according to the food supplied. It plays an important part in metabolism as an oxygen carrier or, more strictly, a hydrogen acceptor.

In lens metabolism it probably enters into close relation with glutathione, the two forming oxidising—reducing systems of great importance.

The lens of the rabbit has no power in itself to form ascorbic acid.

The transparency of the lens is not so directly dependent on its ascorbic acid content as the literature on its relation to cataract would suggest. Its decrease or absence in an opaque lens cannot straightway be regarded as a factor in the causation of cataract. It is not always diminished in cataract, and it may be entirely absent without any sign of cataract (as in scurvy).

Ascorbic acid, while of importance in lens metabolism, is not indispensable, as even in its absence the uptake of oxygen in the lens may remain unchanged.

THOS. SNOWBALL.

III.—OPTIC NERVE

(1) **Moore, Fitzgerald D. (Nigeria).—Nutritional retrobulbar neuritis followed by partial optic atrophy.** *Lancet*, May 22, p. 1225, 1937.

(1) **Moore** gives a clinical description of a syndrome which consists of defective vision, active signs or a past history of sore

tongue, sore mouth, white patches around the lips, a scaly itching scrotum and certain mental and nervous manifestations.

The ocular symptoms are accompanied by photophobia and relatively rapid visual failure caused by retrobulbar neuritis and ending in partial optic atrophy. In two months from the onset of the disease pallor of the optic discs is evident and may be extreme on the temporal side. This condition is curable by the administration of marmite (½ oz. a day) or yeast alone. The skin and mouth lesions are amenable to vitamin B. 2 therapy. It seems that this disorder may be prevented by adequate proteins of high biological value.

The clinical picture, aetiology, incidence, relation to diet and toxic factors are discussed.

H. B. STALLARD.

(2) **Arruga, H. (Barcelona). — The treatment of optic nerve atrophy. (Die Behandlung der Sehnervenatrophie).** *Klin. Monatsbl. f. Augenheilk.*, Vol. XCVII, p. 308, 1936.

(2) **Arruga** based his treatment on the work of Lauber and his associates at Warsaw who hold that the nutrition of the optic nerve is unfavourably affected if there is disproportion between the ocular tension and the general blood pressure. A relatively high ocular tension, though within normal limits, will affect the capillary circulation if the general pressure is low. Treatment therefore aims at raising the blood pressure and lowering the tension. The author reports 15 cases, six of them in detail, and found that in tabetic optic atrophy the general blood pressure was low, that the course of the atrophy was favourably affected when the pressure was raised; he further found that in glaucoma, vision improved when the pressure was raised and became worse when this could not be achieved. When it is difficult to raise the pressure the ocular tension is lowered by pilocarpine or cyclodialysis. Injection of strychnine (1-10 mg.), alternating with injections of caffeine and adrenalin (50-100 cg. caffeine and 10-20 minims of adrenalin 1:1000); ephedria (1-2 tablets up to 50 cg. by mouth daily); ephetonin (2 tablets); and atropine (½-1 mg.) were the medications employed in addition to general measures.

ARNOLD SORSBY.

(3) **Russo (Bari). — Optic neuritis following measles. (Sulla neuritie ottico da morbillo).** *Boll. d'Ocul.*, March, 1937.

(3) **Russo** has seen three cases of this distressing complication of measles. He notes that it usually appears during convalescence, as an acute retrobulbar neuritis; that it is most frequently bilateral, and has no relation to the severity of the primary illness, but may come on after very mild attacks. He thinks that it represents a

direct action of the toxin on the optic nerve; he assumes a special weakness, hereditary or acquired, on the part of the subject, to explain the rarity of the complication in so common a disease.

Two of the cases went on almost to complete blindness. In the third case, in which the exanthem had very recently subsided, a certain amount of vision remained and the author attributes this result to the drastic treatment which was undertaken to eliminate the toxins as quickly as possible.

HAROLD GRIMSDALE.

IV.—RETINA

(1) **Braun, Reinhard (Rostock).—Retinitis diabetica.** *Arch. f. Ophthal.*, Vol. CXXXVI, p. 256.

(1) This article by **Braun,** which has for its sub-title "a critical study on the basis of 115 cases of diabetic retinal changes" out of 770 diabetics, deals with various questions on the symptomatology, pathogenesis and treatment of diabetic retinitis.

The frequency of this disease has not changed since the introduction of insulin; it is still the elderly persons with the milder chronic type of diabetes that are most usually affected. The different forms of this retinitis are reviewed. Its most notable features are the normal appearance of the optic disc in colour and outline, the entire absence of oedema around the papilla or along the vessels and the absence of ophthalmoscopic signs of changes in the vessels: the yellowish-white sharply defined specks near the disc and between the upper and lower temporal vessels, and haemorrhages usually small and punctate, situated like the specks in the deeper layers of the retina, which may be traced well towards the periphery.

Certain resemblances to albuminuric retinitis are considered to be due to their common site and not to a common origin.

As regards the pathogenesis it is stated that among the components of metabolic disturbance in diabetes probably the greatest importance is to be attached to the factors of intermediate metabolism associated with acidosis and excretion of ketone bodies. It is possible that their influence extends beyond changes in the retinal vessels.

Vascular changes, it is considered, do not play the decisive rôle that has hitherto usually been attributed to them, while hypertension is of no importance.

The writer concludes that no satisfactory explanation for the aetiology of diabetic retinitis is yet forthcoming, but a solution of this problem is likely to be found by further research into the intermediate metabolism, with special reference to the excretion of

ketone bodies, and the excretory capacity of the kidneys, which in at least some cases does seem to have some connection with the diabetic retinal changes.

The part which the vegetative nervous system plays is not explained, but it is certainly of great importance; the balance between the hormones of the pancreas and the chromaffine system may also be of some significance.

Treatment is now as ever almost entirely useless. Insulin, however, has never been found to have a bad effect on the retina or its vessels, nor does it act unfavourably in diabetic retinitis as regards increasing the risks of haemorrhage or of inducing fundus changes in patients on the threshold of hypoglycaemia.

THOS. SNOWBALL.

(2) **zur Nedden, M.—Inheritance of primary retinal detachment. (Vererbung der idiopathischen Netzhautablösung).** *Klin. Monatsbl. f. Augenheilk.*, Vol. XCVII, p. 552, 1936.

(2) **zur Nedden** reports retinal detachment in two members in two different families. In the first both patients were myopes; in the second a hypermetrope and a myope were affected. Reviewing the literature on the hereditary factor in myopia, the author holds that the tendency to detachment is an hereditary condition, unassociated directly with myopia, though the two tendencies may both be inherited together. He discusses the possible underlying retinal factors in the production of hereditary detachment, such as inheritance of cystic degeneration of the retina. He discusses extraneous factors like trauma as significant causes; of the many millions of injuries but few lead to detachment.

ARNOLD SORSBY.

(3) **Spinelli (Bologna).—The origin of retinal holes. (Sulla patogenesi della rottura retinica e genesi del distacco).** *Boll. d'Ocul.*, March, 1937.

(3) Though it is nearly universally accepted that holes in the retina are the immediate cause of detachment, the cause of the hole is still to seek; it can be a rare occurrence to watch the formation of a hole and the case published by **Spinelli** is such a one.

The patient had a detachment of old standing in one eye, and a recent detachment with several ruptures in the detached area of the other eye. Below the disc and to the nasal side, was an oval area with well marked edges, showing the choroid through it. The ruptures were sealed by diathermy coagulation and the retina returned into place. In a short time, however, it was seen that the oval area had become a hole and that there was a second detachment in this area. This made another operation necessary which was

again successful, but after a short time a series of small ruptures were seen in the upper periphery; the patient refused further treatment. The author thinks that in this case, though not necessarily in all, the hole was the result of a change in the retina, and that the movements of the fluid vitreous may have assisted in the separation of the retina. (The description of the oval area when first seen with its well marked greyish edges and the choroid showing through, suggests that it was already a "hole.")

HAROLD GRIMSDALE.

(4) **Stock, W. (Tubingen).—On an undescribed form of pigmentary degeneration of the retina with complete mental degeneration running a rapid course. (Ueber eine bis jetzt nicht beschriebene rasch verlaufende Form der Pigmentdegeneration der Netzhaut mit vollständiger Verblödung).** *Klin. Monatsbl. f. Augenheilk.*, Vol. XCVII, p. 577, 1936.

(4) **Stock** discusses the association of cerebral degeneration with retinal degeneration described by him, 1908 (known on the Continent as Vogt-Stock-Spielmeyer disease, and in England as the Batten-Mayou disease, so named after chronologically earlier reporters). In the present article he reports the case of a man aged 25 years, with two healthy brothers and a sister who had died in an institute for the mentally defective; the patient had within less than a year after the onset of eye symptoms became blind and demented and died in an attack of hyperpyrexia. There were the typical histological changes in the retina and the brain. The points of interest were the onset in the third decade of life and the rapid course.

ARNOLD SORSBY.

V.—MISCELLANEOUS

(1) **Seidel, E. (Jena). — On the measurement of the blood pressure in the venae vorticosae of the human eye with normal intra-ocular pressure. (Ueber die Bestimmung der Blutdruckhöhe in den Vortexvenen am menschlichen Auge mit normalen Augendruck).** *Arch. f. Ophthal.*, Vol. CXXXVI, p, 303.

(1) **Seidel** employed in albino eyes the same method for estimating the blood pressure in the vortex veins as has been used for the central veins of the retina, by applying pressure on the eyeball and making observations with the ophthalmoscope on the sinus or ampulla of the veins at the point of exit into the sclera.

He points out that the physical conditions in the vortex veins on pressure on the eye are fundamentally the same as in the central retinal veins at their exit on the optic disc, but will have a different effect on the former, because with their greater diameter and larger blood-stream the engorgement and rise in blood pressure following the check to the blood-flow will be more marked, the elastic tension of the vessel wall to be overcome greater, and the energy required to empty the sinus increased.

These factors, together with the less superficial situation of the vortex vein, covered as it is by the retina and the choroid, would cause a delay in the collapse in the vein and make the pressure in it seem higher than is really the case, as compared with the retinal vein.

One must, therefore, note the moment at which the external pressure causes the slightest narrowing and pallor of the sinus at its scleral end, and not wait for its complete collapse; this is found to take place, like the collapse of the retinal vein, by a minimal addition to the normal intra-ocular pressure, so that the blood pressure on the vortex vein must be only a few millimetres above it, and is the same as that in the retinal vein.

The difference in pressure between veins and capillaries is very small, as between them there is practically no resistance in the vessel to be overcome, so it follows from the results given above that the blood pressure in the capillaries of the choroid will be about 30 mm. Hg.

THOS. SNOWBALL.

(2) **Lauber, H. (Warsaw).—The general blood pressure and the retinal blood pressure in relation to the intra-ocular pressure and its influence on the optic nerve and retina. (Das Verhältnis des allgemeinen Blutdruckes und des Druckes in den Netzhautgefässen zum intra-okulären Druck und sein Einfluss auf den Sehnerven und die Netzhaut).** *Zeitschr. f. Augenheilk.*, Vol. LXXXVII, p. 65, 1935.

The influence of low general blood pressure on the course of optic nerve affections. (Der Einfluss niedrigen allgemeinen Blutdruckes auf den Verlauf von Sehnervenerkrankungen). *Wien. Klin. Wochenschr.*, Vol. II, p. 1079, 1935.

(2) **Lauber** recalls and emphasizes the work of his assistant, Sobanski, who has carried out extensive investigations on the pressure in the intra-ocular vessels by means of an ophthalmodynameter of his own design. The diastolic venous pressure is an indication of the intra-cranial pressure. Papilloedema develops when the intra-cranial pressure is higher than the venous diastolic pressure; it can therefore develop with a normal intra-cranial pressure if the general blood pressure is low. It is thus that pseudoneuritis becomes intelligible, and it is also clear why glaucomatous

atrophy need not supervene with increased intra-ocular pressure if the general blood pressure is high. A low blood pressure is therefore to be regarded as unfavourable in cases of progressive optic atrophy, and in fact these cases of tabetic optic atrophy in whom the blood pressure was low and the intra-ocular tension relatively high did worst. Means of raising the blood pressure or preferably lowering the intra-ocular tension by such procedures as cyclodialysis or the use of miotics, are therefore to be employed. Not only was progressive deterioration in optic atrophy checked by such measures, but improvement was obtained in some. The avoidance of retinal ischaemia is the object to achieve.

ARNOLD SORSBY.

(3) **Suganuma, S. (Tokyo).—Studies on the blood pressure in the central artery of the retina. First communication: The relationship of the blood pressure in the central artery of the retina to the general blood pressure in the healthy individual. (Studien ueber den Blutdruck in der Zentralarterie der Netzhaut. I Mitt. Ueber den Blutdruck in Zentralarterie der Netzhaut bei gesunden Menschen und ueber seine Beziehung zum allgemeinen Blutdruck).** *Klin. Monatsbl. f. Augenheilk.*, Vol. XCVI, p. 74, 1936.

(3) In this first communication **Suganuma** gives a careful review of the present state of this problem, and describes an apparatus of his own for the measurement of the pressure in the retinal arteries. The detailed findings in 65 young and healthy adults are set out. The author finds the average systolic pressure to be 59·7 mm. Hg, and the diastolic 38·5 mm.; these are higher than Bailliart's findings, but lower than those of most other observers. The ratio and the general pressure ranged between 0·35 and 0·61, being in most cases within the limits of 0·44—0·55. The diastolic pressure in the retinal artery seems to have no relationship to the general diastolic pressure. The average arterial pulse pressure in the retina was 21·2 mm. The blood pressure in the two eyes is not always identical, and as the intra-ocular pressure in the eye with the higher blood pressure is not necessarily higher than in its fellow, there seems to be no relationship between the normal intra-ocular pressure and the retinal arterial pressure.

ARNOLD SORSBY.

(4) **Weekers, L. and Barac, G. (Liége).—Ocular manifestations of Quincke's oedema. Paroxysmal allergic intra-ocular oedema. (Les manifestations oculaires de l'oedème de Quincke. L'oèdeme allergique paroxystique intra-oculaire).** *Arch. d'Ophtal.*, N.S. 1, p. 193, 1937.

(4) **Weekers** and **Barac** review the literature on Quincke's oedema and the allergic manifestations which are accompanied by

oedema of the uveal tract and the ocular adnexa. The oedema affects the lids, conjunctiva, cornea, orbit and optic nerve. The oedematous tissues are white, pit on digital pressure and are painless. Other ocular complications are corneal exfoliation, deposits on the posterior surface of the cornea, exudate in the anterior chamber, recurrent iritis, pupillary alterations, transitory intra-ocular hypertension, optic neuritis, ocular palsies, transitory exophthalmos and hemianopia.

The authors' case had evidence of hepatic disorder and urticaria which occurred after eating eggs and drinking milk. The lids, the cornea and the ipsolateral side of the face suffered from recurring attacks of oedema which were accompanied by headache and ocular pain on the same side. The cells on the posterior surface of the cornea, the exudate in the anterior chamber and the changes in the iris they believe are not due to iridocyclitis but to vascular disturbance.

The blood count showed a decrease of polymorphonuclear leucocytes, an eosinophilia of 4 per cent. and an increase of lymphocytes. On the same side as the affected eye the nasal mucosa was oedematous and there was an increased secretion of mucus.

The attacks of oedema and raised intra-ocular pressure recurred at short intervals and resisted all forms of treatment in the way of attempts to eliminate possible allergens from the diet, protein therapy, autohaemotherapy, the administration of calcium, sodium hyposulphite, magnesium, ergotamine, adrenalin and ephedrine and other substances. The interval between attacks became greater and the severity of the attacks less after all treatment had been abandoned. In discussing the case the authors believe that the oedema is of the angioneurotic type, that it affects the uveal tract, occurs in paroxysms and causes an increase of intra-ocular pressure.

H. B. STALLARD.

(5) **Gutsch, W.—Ultra-shortwave therapy of the eye. (Ultra kurzwellenbehandlung des Auges).**

Kokott, W.—Concerning shortwave therapy of the eye. (Zur Frage der Kurzwellenbehandlung des Auges). *Klin. Monatsbl. f. Augenheilk.*, Vol. XCVII, pp. 386 and 448 resp., 1936.

(5) **Gutsch** treated 276 patients by short waves (waves 6 m. long, sittings 2-3 weeks, duration 6-8 minutes at first, later 15 minutes per sitting). In corneal lesions no results were obtained; in acute iritis, the pain but not course of the affection, was diminished. In chronic iridocyclitis the results were good, especially so in tuberculous lesions. Favourable results were also seen in inflammatory lesions of the fundus. Orbital and lacrymal sac inflammations responded well. Glaucoma and scleritis gave no

results. Good results were seen in ocular palsies and in supra-orbital neuralgia when the head was exposed to the rays.

Kokott reports experimental studies to show the value of ionization treatment *in vacuo*. The movement of the medication is thus greatly influenced. Fifty patients with episcleritis and corneal infiltrates responded well to this method of iontophoresis.

ARNOLD SORSBY.

BOOK NOTICES

Visual Perception. By M. D. VERNON, M.A. Pp. 247. Cambridge University Press. 1937. Price, 15/-.

This book is an extremely valuable account of experimental work on the nature of Visual Perception, culled from many scattered sources. It is particularly useful in fully discussing the work of the *Gestalt* school of psychologists, much of which is buried in journals not very readily accessible. There is no doubt that in visual perception the whole is in some ways greater than and more than a mere integration of parts. The theory of which visual perception affords so many striking examples, is of wide application to other realms of thought, as has been popularly expressed by General Smuts in his treatise on Holism, in which, however, the prior work of German psychologists is passed over in silence.

This is the first comprehensive and detailed collection of the experimental data. Miss Vernon has contented herself with a clear enunciation of the facts, without bias, and indeed with relatively little criticism. The development and completion of the perceptual process are described, together with the nature of the percept in relation to subjective factors in the observer. Spatial perception, including the relationship of the "pattern" or "figure" to the "ground," as well as the very interesting phenomena of apparent movement, are well discussed. There is an excellent chapter on the genetic development of perception in children, and a typological classification of individual differences. A very useful appendix on tachistoscopes, and a satisfactorily full bibliography conclude the volume, which is produced in the efficient manner characteristic of the Cambridge University Press.

Royal Westminster Ophthalmic Hospital. Annual Report, 1937.

The 120th annual report of the Royal Westminster Ophthalmic Hospital follows the usual lines and contains much that is of interest apart from the bare records of income and expenditure, subscribers, etc. The memoir of George James Guthrie, F.R.S., contributed by Harold Grimsdale to our third volume in 1919 has been reprinted

and illustrated by a copy of the oil painting in the Board Room of the Hospital.

The secretary of the Hospital, Captain J. H. Johnson, gives a short history of St. Giles and Broad Street which is illustrated by an early map of the district. There are also reports dealing with the ophthalmological school and the school of orthoptics in connexion with the Hospital.

During the past year the Hospital has been extended to 100 beds by the enlargement of Swinburne Ward and a clinical room has been installed. A third house surgeon has also been appointed.

Die Funktionsprufung des Auges. By PROF. DR. OLOFF and DR. PODESTA. Second Edition. Pp. IV, 190. Berlin: Julius Springer 1937. Price, R.M. 7.50.

Oloff and Podesta's "Examination of the functional capacity of the eye" is the second edition of a book by Stargardt and Oloff which appeared in 1912 and dealt with the examination of the colour sense only. In the present edition considerably more than half of the text is still devoted to colour vision, the rest being distributed over central vision, accommodation, refractive errors, perimetry, light sense and the extra-ocular muscles. There are also chapters on malingering and on the visual requirements in the public services of Germany. Of necessity there is a distinct discrepancy in the treatment of colour vision on the one hand and the remaining visual functions on the other hand. The section devoted to colour vision and its anomalies is indeed a satisfactory summary of the practical measures in common use. The theoretical aspect is not neglected and it is rather surprising that the anomalies of colour vision are spoken of in the terminology of red-green blindness and such-like terms. This is all the more strange as throughout the text the more modern outlook is given. The book is devoid of illustrations and has been written with an eye to the requirements of medical officers in public services. With that object in view the additional material contained in this edition may prove helpful, but this, as the authors seem to recognize, will not replace the necessity for practical work in an ophthalmological clinic.

Ophthalmic Hospital of St. John of Jerusalem. Annual Report, 1936. Chancery of the Order, London, E.C.1

The Warden's Report shows that of the 14,327 new ophthalmic patients seen and treated, 93·4 per cent. were obviously infected with trachoma. This is a slightly increased incidence as compared with the experience of the previous year, and is considered to be due to the cycle of severe epidemics of acute conjunctivitis. In Palestine this is probably the usual method of acquiring trachoma. Although trachoma here ranks as one of the lesser causes of blindness, it is a disease which, if left untreated, may lead to much

impairment of vision and economic disability. Fortunately, the fellahin realize that the presence of trachoma may be a bar to education and future employment of their children, and are now inclined to seek treatment early for them.

The great majority of the patients were Moslems, while only 2·7 per cent. were Jews. In 1927, the Jews accounted for 20 per cent. of the patients; their diminution is due to the great multiplication of their own denominational hospitals.

The patients who are blind in one or both eyes were 13 per cent. of the total; the majority of these contracted their disability as the result of some form of conjunctivitis.

Owing to the unsettled state of Palestine there was a diminution of 30 per cent. in the out-patient clinic.

CORRESPONDENCE

To the Editors of THE BRITISH JOURNAL OF OPHTHALMOLOGY.

DEAR SIRS,—Allow me to draw attention to two mistakes in the abstract of my paper on the Pathology of Trachoma which appears in the May issue of the ***Brit. Jl. of Ophthal.***

In the first place, the following statement is made: "No plasma cells are seen in the peripheral zone" (of the trachoma follicle). This should read "No plasma cells are seen in the *central* zone." This mistake appears in my own paper as published in the ***Bull. of the Ophthal. Soc. of Egypt***, but is unfortunately due to a printer's error and to an oversight in the proof reading.

Secondly, on p. 247, it is stated "The invasion of the cornea by an inflammatory exudate is between the epithelium and Bowman's membrane." My own statement read as follows: "The zone of infiltration is very superficial but Bowman's membrane is often destroyed in the affected area."

My wording is perhaps not as clear as it might have been, but I certainly never meant to convey the impression which appears in the abstract. Indeed, the facts are quite otherwise—in the early stages of the disease, the invasion of the cornea by the inflammatory exudate is always ***deep*** to Bowman's membrane but in the ***superficial*** lamellae of the cornea.

I am,

Yours faithfully,

ROWLAND P. WILSON.

MEMORIAL OPHTHALMIC LABORATORY,
GIZA, CAIRO.
June 19, 1937.

UNIV. OF MICH.

OBITUARY

PROFESSOR DE LAPERSONNE

Félix de Lapersonne was born at Toulouse in 1853. His medical studies were carried out Paris with such distinction that he received an appointment at Lille, where he became Professor of Ophthalmology in 1890. Eleven years later he was recalled to Paris to succeed the great Panas.

Almost all ophthalmological subjects received his attention, and his reports and papers are to be found in the *Bulletin de la Société Française d'Ophtalmologie* and in the French ophthalmological journals.

He became a member of the "Académie de Medecine" in 1914, and its President in 1931, in which year he was made a Commander of the Legion of Honour.

On the inauguration of the "Association Internationale de Prophylaxie de la Cécité" at the XIII Concilium Ophthalmologicum he became its first President. The Association has been organized with great skill and shares offices in Paris with the "International Association against Tuberculosis," at 66, Boulevard Saint-Michel. For his work in this direction he received the Leslie Dana Gold Medal in 1934. The combined meetings of the "Association" with the "International Organization against Trachoma" owed a great deal of their success to de Lapersonne's forethought and presidency.

The distinction of his appearance and the clarity of his speeches gave him an international reputation.

Although the present writer had enjoyed the friendship of the subject of this notice for thirty years he is unable to express more gracefully his estimate of de Lapersonne's personality than by quoting these extracts from French journals:—

"On ne pouvait pas voir de Lapersonne sans être séduit par l'élégance de ses manières qui reflétait si bien la distinction de son esprit; on ne pouvait pas l'entendre sans être captivé par le charme de sa parole, une parole douce et presque souriante." (*La Presse Médicale.*)

"Une curiosité éveillée, une intelligence qui débordait le cadre des occupations professionelles et s'ouvrit á toutes les lumières." (*Journal de Practitiens.*)

NOTES

Death

WE regret to note the death of Mr. William Lang of 22, Cavendish Square, London, W.1, Consulting Ophthalmic Surgeon to the Middlesex Hospital and the Moorfields Eye Hospital. In his generation he stood out for his qualities as a clinician and teacher. An obituary notice is being prepared and will appear in the next number of this Journal.

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Appointments

Mr. E. F. KING, F.R.C.S., has been appointed Assistant Surgeon to the Royal London Ophthalmic Hospital (Moorfields).

In succession to Colonel H. Kirkpatrick, M.B., Ch.B., Lt.-Colonel Robert E. Wright, C.I.E., M.D., D.P.H., B.Ch., B.O.A., I.M.S., has been appointed by the Committee of Management of the Seamen's Hospital Society, to the office of Honorary Ophthalmic Surgeon to the Hospital for Tropical Diseases, Gordon Square, W.C.1.

* * * *

Post-graduate Lectures

A COURSE of six lectures on some aspects of Medical Ophthalmology will be given in the Tennent Memorial Institute of Ophthalmology, Church Street, Glasgow, on the following dates:—

Tuesdays, September 7 and 14—
Hypertension, vascular sclerosis and renal disease.
Professor A. J. Ballantyne.

Tuesdays, September 21 and 28—
Diabetes.
Dr. John Marshall.

Tuesdays, October 5 and 12—
Diseases of the central nervous system.
Dr. I. Chesar Michaelson.

The time of the Lectures will be 4.30 p.m.

FUTURE ARRANGEMENTS

1937

October 1.—Midland Ophthalmological Society, at the Eye Hospital, Birmingham (Annual Meeting).

December 7.—Midland Ophthalmological Society, at Birmingham Eye Hospital (Middlemore Lecture).

CONTEMPORARY OPHTHALMIC LITERATURE

Archives of Ophthalmology. *July, 1937.*

MESSINGER and CLARKE. Retinal tumours in tuberous sclerosis: review of the literature and report of a case, with special attention to microscopic structure.
COWAN and FRY. Secondary cataract, with particular reference to transparent globular bodies.
BURTON CHANCE. A sketch of the early days of ophthalmology in Philadelphia.
EAGLETON. Suggestions for prevention of ocular and aural sequelae of meningococcic meningitis.
HAGEDOORN. Adenocarcinoma of a Meibomian gland: report of additional cases.
DYAR and MATTHEW. Use of sucrose preparatory to surgical treatment of glaucoma.
PFEIFFER. Hypersensitivity to pantocaine: report of a case.
BOTHMAN. Repair of choroidal detachment: report of a case.
BLOCH. Embryotoxon corneae posterius Axenfeld: review of the literature and report of a case.
PREWITT. Retinal detachment due to allergy: report of a case.
BELLOWS. Effect of cysteine hydrochloride on the conjunctiva.
MYERSON and THAU. Human autonomic pharmacology: IX. Effect of cholinergic and adrenergic drugs on the eye.
LEVITT. Tumour of the optic chiasm and optic nerves: report of a case.
BROWDER. Treatment of carotid artery-cavernous sinus fistula: report of a case.

American Journal of Ophthalmology. *July, 1937.*

WETZEL. Melanoblastoma of the lacrymal caruncle.
HAGEDOORN. The chiasmal syndrome and retrobulbar neuritis in pregnancy.
DE GROSZ. Dimethyl-sulphate poisoning in relation to ophthalmology.
FINE and LACHMAN. Retrobulbar neuritis in pellagra.
PINKERTON. Surgery of the leprous eye.
VERHOEFF. The Souter tonometer.
HARTSHORNE. A note on diastolic pressure and glaucoma.
CONSTANTINE. Lundsgaard's modification of Holth's iridencleisis.
SOLANES. Gonioscopy of the surgical colobomas of the iris.

Zeitschrift für Augenheilkunde. *June, 1937.*

PROCKSCH. Operative expectation in complicated cataract.
HAUSMANN. About the permanent result of cyclodialysis.
JOHANSSON. The aetiology of iridocyclitis.
WIKTOR. Exhibition of artificial eyes with expression.

July, 1937.

DAVIDS. Eye diseases from agranulocytosis.
REINHARD FRIEDE. Soft cataract and residual cataract. Eyes made cataractous from hyphaema, hypopyon and keratoplasty.
REISER. Haemorrhage in the fundus.
KLAR. Contribution to the pathogenesis of herpes corneae. (Based on the material at the Bonner Eye Clinic.)
PAAS. Bilateral glaucoma with leontiasis ossea.

Klinische Monatsblätter für Augenheilkunde. *June, 1937.*

PASCHEFF. Ophthalmomyasis externa oestrus ovis. Contribution to myasis in Bulgaria.
FUCHS. Lepra bacilli in clinically apparently normal eyes.
VOGT. Histological conditions of further cases of relatively new spontaneous (senile-myopic) retinal detachment. With remarks on vitreous jactitation (Jactatio corporis vitrei).

TERTSCH. Latent retinal holes in the region of a choroidal coloboma and traumatic retinal detachment.
SCHEYHING. Cure of glioma retinae through Röentgen rays.
STREBEL. Improvement of the Prince's prolapse method.
GASTEIGER. Senile degeneration of the sclera and of the insertion of the ocular muscles.
SCHUM. A case of bilateral Moreen's ulcers.
SCHLEY. The value of Röentgen examination of the vertebral column for diseases of the iris.

July, 1937.

DENIG. Iris torsion compared with Lagrange's operation and with cyclodialysis.
VOGT. Results of diathermy puncturing of the ciliary body (cyclo-diathermo-puncture) in glaucoma.
KNAPP. The question of after-cataract operation.
STREBEL. Objective demonstration of the curative orthopaedic effect of contact glasses in conical cornea.
STREBEL. Dominant hereditary transmission of pterygia.
GASTEIGER. Malformation in the region of the iris and of the filtration angle and their clinical significance.
SCHMIDT. Some rare deformities of human eyes.
PASCHEFF. Symmetrical hyperplastic granulomatosis of the conjunctiva from fungoid mycosis.
LÜDERITZ. Co-optation of wound edges in normal lenses.

Annali di Ottalmologia e Clinica Oculistica. *November, 1936.*

FAVALORO. Central embryonic and foetal zonular cataracts. (Clinical and biomicroscopical contribution.)
SMALTINO. Catadioptric image of the eye.
BONSOTTI. Contribution to the study of lens antigen therapy.
NASTRI. Clinical and dioptrical research on a catadioptric image of the eye. (VI image of Tscherning.)

January, 1937.

BIFFIS. Anatomo-pathological and microbiological research on the alterations of the optic nerve in progressive paralysis.
SPADAVECCHIA. The general arterial pressure and ocular tonus.
BORSOTTI. Further experimental researches on lens antigen therapy.

March, 1937.

BIFFIS. Anatomo-pathological and microbiological research on the alteration of the optic nerve in progressive paralysis.
DE SANCTIS. The action of Doryl on normal and glaucomatous eyes.
ALIQUO-MAZZEI. Trachoma and affections of the lacrymal passages.
BARATTA. Experimental research on pupillometry by the demonstration of anisocoria in chronic appendicitis.

Revista Oto-Neuro-Oftalmologica. *May-June, 1937.*

CHIASSERINI and NEUSCHÜLER. Cervico-thoracic sympathectomy in the cure of retinitis pigmentosa.
PORTA and VEDOVA. Nystagmus in cerebral affections.

Archivos de Oftalmologia de Buenos Aires. *March, 1937.*

ZAVALIA, ALLENDE and OLIVA. Scleromalacia observed in the course of chronic porphyrinuria.

April, 1937.

ARGUELLO and PEREIRA. Use of sodium evipan in ocular surgery.
FORTIN. Entoptic phenomena. Intra-retinal liquid.
GALLINO. Sight-saving sohools. Object and organization.